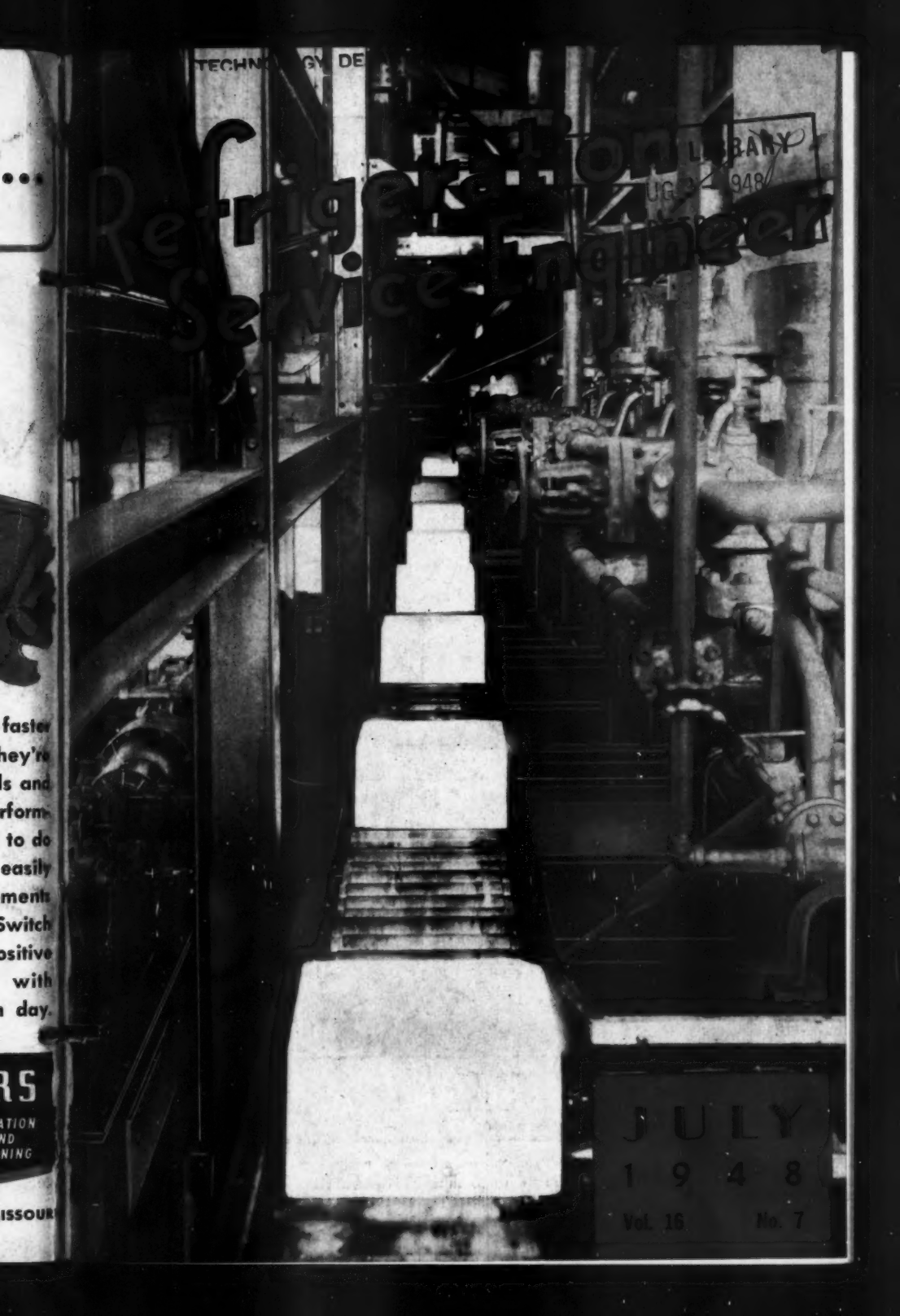
Refrigeration
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FOR BETTER PERFORMANCE USE

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A tiny drop of water . . .

REFRIGERATION'S BIGGEST PROBLEM!

LIQUID Sulfur Dioxide ANSUL

LIQUID Methyl Chloride ANSUL

REG. U.S. PAT. OFF.

Important Questions

. . . IN SELECTING A DRIER

1. Does the material dry the refrigerant below the corrosion limits when placed in the liquid line? In the suction (vapor) line?
2. Does the material dry the refrigerant below the limits for ice formation with methyl chloride and the "Freon" refrigerants?
3. Does the material accomplish the drying in one passage of the refrigerant, or is it slow, i.e., requires several passages?
4. Does the material deteriorate in physical character in handling or when it removes water from the refrigerant?
5. Does the oil affect the drier adversely?
6. Does the drier corrode?

DRYING POWER OF VARIOUS MATERIALS

Drier	Refrigerant	Liquid or Vapor	Max. Residual Water Concentration After Passage Through Drier	
			.25% Initial Water Concentration	.02% Initial Water Concentration
ACTIVATED ALUMINA	Sulfur Dioxide	L	.15	.005
		V	.01	
	Methyl Chloride	L	.02	.006
		V	.01	
SILICA GEL	Sulfur Dioxide	L	.15	.006
		V	.01	
	Methyl Chloride	L	.01	.004
		V	.01	
DRIERITE (Calcium Sulphate)	Sulfur Dioxide	L	.15	.009
		V	.08	
	Methyl Chloride	L	.05	.003
		V	.04	
CALCIUM CHLORIDE $CaCl_2$	Sulfur Dioxide	L	.09	.013
		V	.03	
	Methyl Chloride	L	.10	.005
		V	.04	
CALCIUM OXIDE CaO	Sulfur Dioxide	L	.20	—
		V	.15	—
	Methyl Chloride	L	.15	—
		V	.08	—
BARIUM OXIDE BaO	Sulfur Dioxide	L	.20	.017
		V	.15	
	Methyl Chloride	L	.05	.006
		V	.05	

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ANSUL REFRIGERANTS ARE AVAILABLE AT LEADING WHOLESALERS EVERYWHERE

ANSUL CHEMICAL COMPANY

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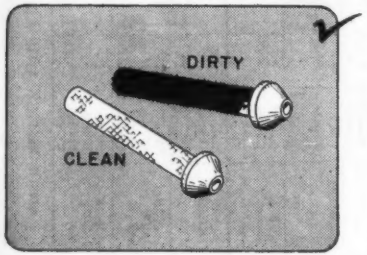
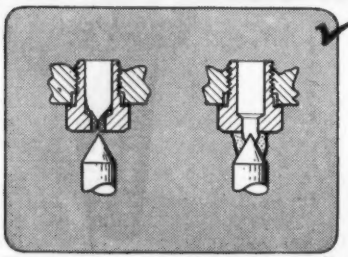
BEFORE YOU BLAME THE EXPANSION VALVE

OVER 98% OF THE VALVES RETURNED SHOW NO DEFECTS

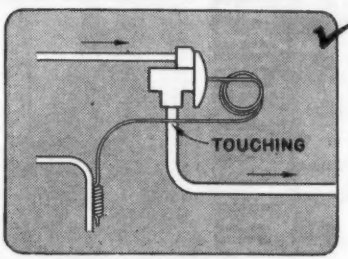


Clogged Inlet Strainer



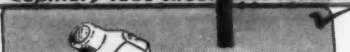
Plugged Orifice

Moisture and Wax in Orifice



Improper Installation of Gas-Charged Valve

Capillary tube should not touch



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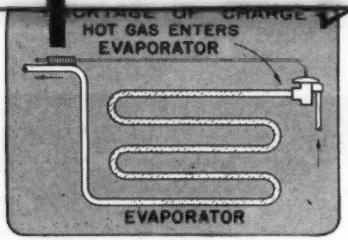

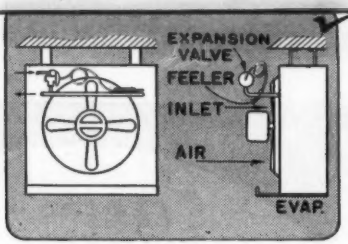

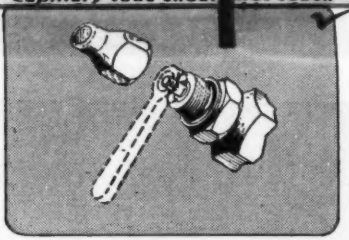

Incorrect Refrigerant Charge

Illustration indicates short charge. An excess is equally undesirable.

Incorrect Bulb Location

Feeler bulb located in return air stream causing valve to overfeed.

Improper Superheat Adjustment

Valves are factory set to operate under average conditions. Readjustment should be made only after several hours of operation.

ALL THESE CAUSES OF VALVE FAILURE CAN BE AVOIDED OR CORRECTED IN THE FIELD

5081

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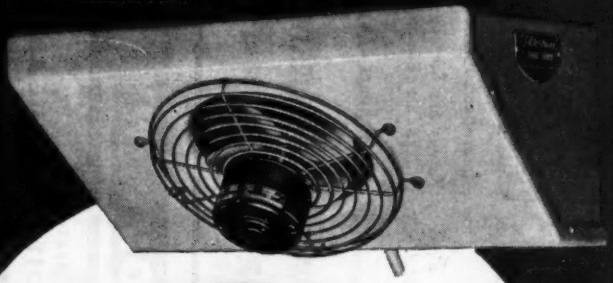

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ALCO

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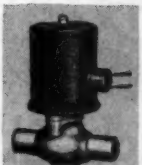
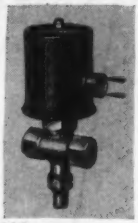
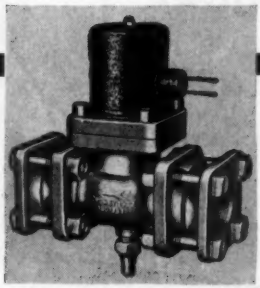
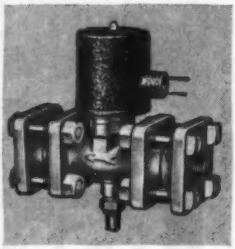
S1


M8

M3


M6


R2, R6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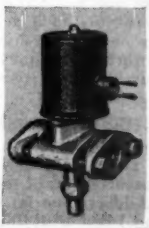
and many other control devices

S2

M9F


M5

M915

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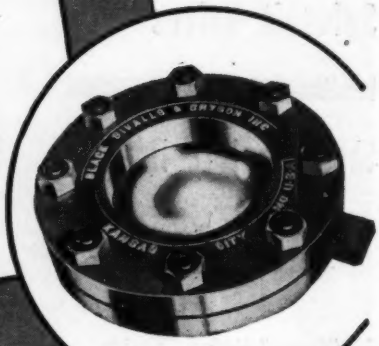

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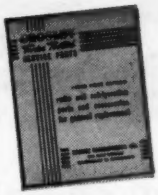

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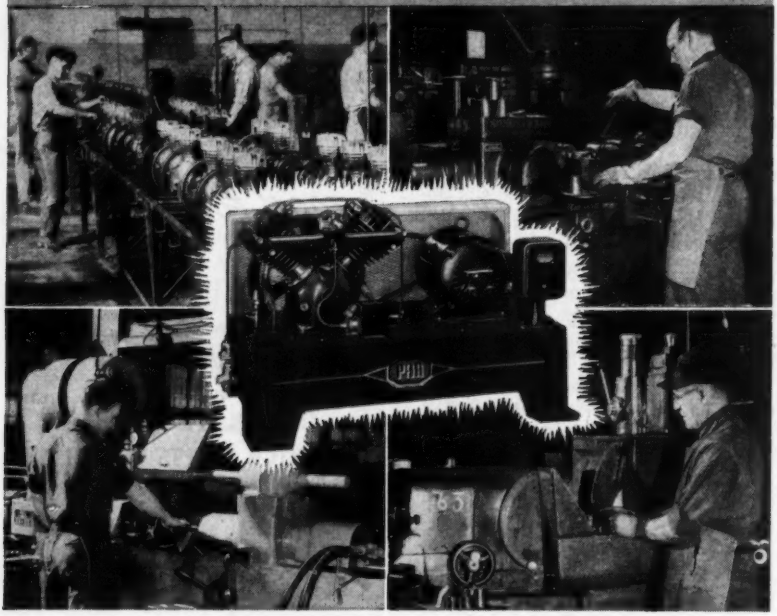

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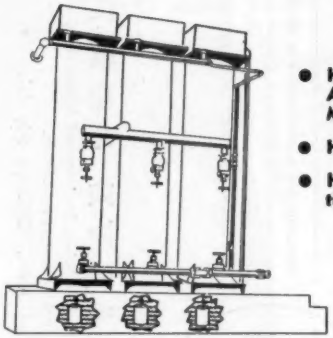

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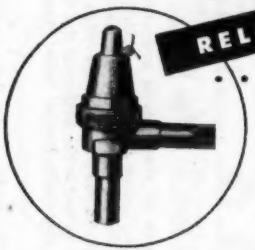

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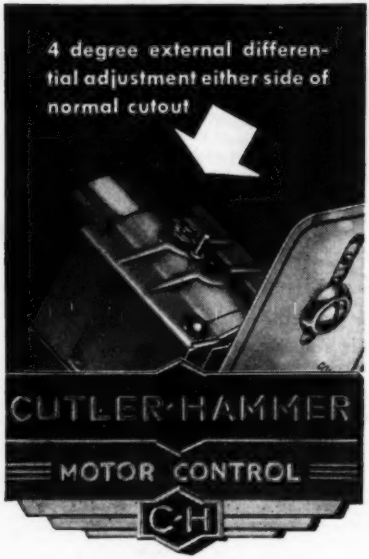
A COMPREHENSIVE LINE

Cutler-Hammer Refrigeration Replacement Control

The Cutler-Hammer line of Refrigeration Replacement Control is unusually comprehensive and complete. One unit alone, the *Universal* unit, will handle 60% of the repairman's needs. In rare cases where exact replacement control must be furnished, that item also will be found in the Cutler-Hammer line, individually packed, clearly labelled, complete with dial plate, mounting screws, trim washers and instructions for mounting, and range and differential adjustments.

The Cutler-Hammer Line of Refrigeration Replacement Controls is the product of more than 50 years of fundamental control specialization . . . another reason why outstanding refrigeration wholesalers recommend it and alert service organizations from coast to coast feature and use it. . . .

CUTLER-HAMMER, Inc., 1363 St. Paul Ave., Milwaukee 1, Wis.



This One Universal unit alone covers 60% of all needs.

Bul. 9521N9

Adjustable Mounting Brackets
Maximum Mounting Centers 4-3/16
Minimum Mounting Centers 2-3/16

Adjustable Cutout Feature—Differential can be increased 4 degrees by turning indicator in "Hi" direction and decreased 4 degrees by turning in "Lo" direction.

Adjustable Range—Turning screw clockwise lowers settings and counter-clockwise raises settings.

Operating knob can be adjusted to meet various evaporator scale settings. New knob is ideal for varying shield thicknesses. Makes *this* control adaptable to wider range of single dial replacement jobs where overload is *not* required in unit.

Unsurpassed THERMAL EXPANSION VALVES

1/2 TO 5 TON CAPACITY

High or Low Temperature Applications
Freon, Methyl-Chloride, Sulphur Dioxide

Request colorful Refrigeration Catalog No. 200-1 illustrating complete line of Thermal Expansion, Magnetic Stop, Ammonia Suction Stop Valves and Strainers.

GENERAL CONTROLS

Manufacturers of Automatic Pressure, Temperature and Flow Controls.

FACTORY BRANCHES: BIRMINGHAM (3), BOSTON (16), CHICAGO (5), CLEVELAND (15), DALLAS (2), DENVER (10), DETROIT (8), GLENDALE (1), HOUSTON(2), KANSAS CITY (2), NEW YORK (17), PHILADELPHIA (40), PITTSBURGH (22), SAN FRANCISCO (7), SEATTLE (1). DISTRIBUTORS IN PRINCIPAL CITIES.

All Right . . . where does the Moisture go?

"It sure worked on that job," says Mr. Service Engineer. "But where does the moisture go when THAWZONE acts on it?"

"We'll try to explain," we say. "But please bear with us if our explanation sounds complicated."

Water has the chemical formula H_2O. Chemically, however, it generally behaves as if it were made up of two parts: an H+ (positive hydrogen ion) and an OH− (negative hydroxyl ion). There are various compounds that interact with water to split it up this way. Most of them are unsuited to a refrigeration system.

THAWZONE, however, is a solution of compounds which are suitable. All they do is to "grab" on to the H+ with one part and the OH− with another. The resulting new compounds are complex, but oil-soluble and inert. As a matter of fact, to separate these materials and identify them is almost impossible. This is another indication of their inertness and similarity to the oil normally present in refrigerating systems.

And . THAWZONE is economical. Figured on pint quantities, it costs only 8c to treat a pound of refrigerant. Use it in new, re-conditioned or old systems.

THAWZONE*
PATENTED
The PIONEER FLUID DEHYDRANT

HIGHSIDE CHEMICALS CO.
195 VERONA AVE., NEWARK 4, N. J.

ALSO MAKERS OF
TRACE*
REFRIGERANT LEAK DETECTOR

*Trade Mark Reg. U. S. Pat. Off.

It's not HOW MUCH moisture you remove from a refrigeration system that counts...

It's HOW LITTLE moisture is left!

SPORLAN

To really dry a system...install a

SPORLAN *Catch-All*

THE CATCH-ALL IS AVAILABLE IN ⅛, ½ AND 1 TON SIZES

...THE PERFECT FILTER-DRIER!

1. *The unique porous cylinder of the Sporlan Catch-All is molded of minute particles of a highly efficient desiccant, whose efficiency is greater than that of the same desiccant in granular form.*
2. *The Sporlan Catch-All after being completely assembled is activated to a high degree of dryness which, in turn, assures drying the system to an extremely low end point.*
3. *Immediately after activation, the Sporlan Catch-All is sealed with moisture proof seals so that it can not pick up any moisture before installation.*
4. *Due to its molded construction, the Sporlan Catch-All cannot powder. Therefore, none of the desiccant can pass into the system, causing expensive breakdowns.*
5. *Again, due to its molded construction, the Sporlan Catch-All cannot pack. Packing of the desiccant in an ordinary drier causes a high pressure drop, which is never present in the Catch-All.*
6. *And again, due to its unique molded construction, the refrigerant cannot channel around the desiccant of the Sporlan Catch-All. All of the refrigerant must go through the molded porous cylinder.*
7. *In addition to efficiently drying the refrigerant, the molded porous cylinder of the Sporlan Catch-All will catch all scale, solder particles, carbon, sludge, dirt or any other foreign matter as minute as 9 microns with negligible pressure drop.*

The use of oversize driers does *not* solve the moisture problem on most jobs. The only real solution is to use a drier that dries down to a *low end point*... a point *so low* that any remaining moisture is absolutely harmless!

HERE IS WHY THE SPORLAN CATCH-ALL IS THE PERFECT FILTER-DRIER

If you want refrigeration systems that are REALLY DRY... *install* SPORLAN *Catch-Alls and get Peak Performance on all installations.*

SPORLAN VALVE CO.

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DOUBLE DISCHARGE
KRAMER TRENTON CO. Trenton 5, N. J.

For the Big 3

TROUBLE-FREE PERFORMANCE
USER ACCEPTANCE
COMPETITIVE PRICE

Buy Kelvinator

Yes, all *three* of these basic sales advantages are yours when you buy Kelvinator condensing units. For they're priced *competitively* . . . they perform *dependably* . . . and they bear *a name that customers know means quality!*

Throughout their production, Kelvinator condensing units are precision-tested to insure top-notch performance under all conditions. Their complete *dependability* makes Kelvinator the name that always *sells*, always *satisfies.*

Just drop in at one of Kelvinator's 50 convenient supply depots. Each carries a *complete* stock of refrigeration parts and supplies, *competitively* priced. You'll always find fast, friendly service at Kelvinator . . . Kelvinator Division, Nash-Kelvinator Corporation, Detroit, Michigan.

GET YOUR COPY!

Here's a new catalog for the *quick, easy* way to buy refrigeration parts and supplies. All information and prices are grouped for easy reference. Ask for it at your local Kelvinator Distributor's or Zone Office.

Kelvinator

CONDENSING UNITS
REFRIGERATION PARTS AND SUPPLIES

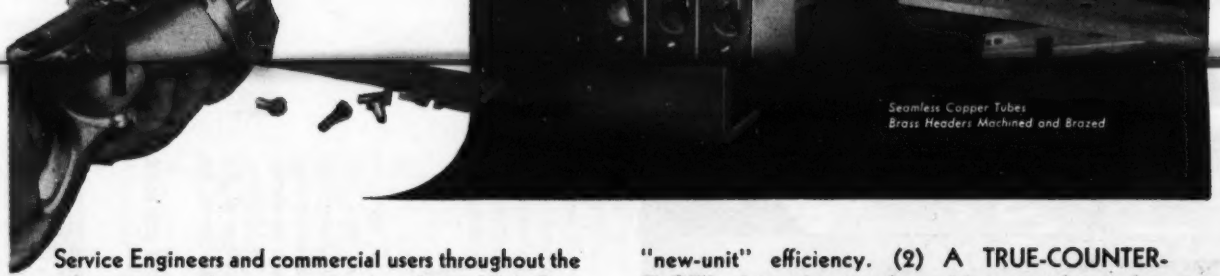
BUY KELVINATOR FOR ALL YOUR REFRIGERATION REQUIREMENTS

This is the Business End of . . .

HALSTEAD & MITCHELL

Cleanable CONDENSERS

Seamless Copper Tubes



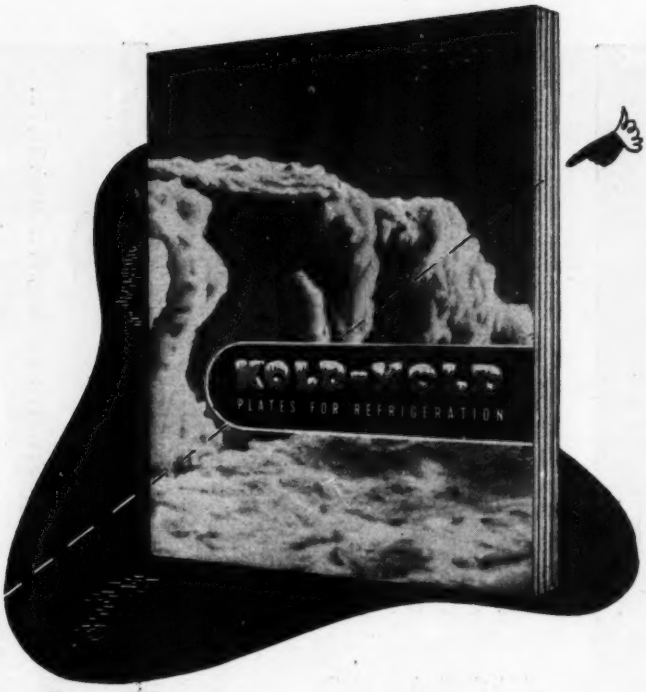
Service Engineers and commercial users throughout the refrigeration industry are now specifying HM Condensers for replacement and conversion orders. These new HM units combine two features never before obtainable in tube-within-a-tube water-cooled condensers; (1) They're CLEANABLE . . . the water tubes are easily accessible at both ends for the spiral cleaning tool to restore the interior water surfaces to "new-unit" efficiency. (2) A TRUE-COUNTER-FLOW relationship is achieved between the coolant and the refrigerant through a unique seamless copper tube-within-a-tube construction that makes obsolete most types of similar water-cooled condensers. Thus, water and space requirements are reduced substantially and a most economical operation is obtained.

JOBBERS in all principal cities carry HM condensers in stock for immediate delivery.

HM Halstead & Mitchell

OFFICES: Bessemer Building, Pittsburgh 22, Pa.

DOUBLE-TUBE COUNTER-FLOW **CLEANABLE** WATER-COOLED CONDENSERS



contents

Refrigeration KNOW-HOW

The new Kold-Hold Catalog is a book of benefits and savings. It contains refrigeration know-how . . . information relative to the better storage and transportation of perishable products at lower costs. This catalog shows that Kold-Hold Serpentine Plate Type Evaporators have no equal in efficiency and dependability for locker plant space cooling, for shelves and stands in sharp-freezing or as cabinet liners, shelves or dividers. It explains how "Hold-Over" Plate Type Evaporators maintain the temperature of delivery bodies at the uniform level necessary in the successful transportation of fresh meat, ice cream, frozen foods and other perishables.

If you are interested in better storage and transportation of your products, write for this new free book of refrigeration knowledge today.

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KOLD-HOLD MANUFACTURING COMPANY
502 E. HAZEL ST. LANSING 4, MICHIGAN

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QUICKLY...
EASILY...
THOROUGHLY...
ECONOMICALLY...

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NU-COIL

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Unit Coolers
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Refrigeration Drains
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Control Valves
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Evaporator Fins
Water Coolers
Temperature Thermostats

CLEAN coils, pipes, and drains with NU-COIL—keep them clear as a whistle . . . functioning like new! NU-COIL removes insulating deposits that increase head pressure and cause loss of operating efficiency. Scaled cooling tubes cleaned with NU-COIL perform with renewed operating efficiency . . . reduced operating costs.

NU-COIL is sufficiently mild for use on expensive light metals and precision fittings. NU-COIL is *easy* to *handle* . . . Requires no special handling equipment.

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NEW!

MARSH DUO-THERM THERMOMETER

Guardian of Freezer and Refrigerator Operation

FREEZER TEMPERATURE AND ROOM TEMPERATURE

...both on one easy-to-read dial!

The Duo-Therm Thermometer is the newest development in Marsh refrigeration instruments—and a much needed one! For permanent installation in connection with locker plants, walk-in coolers, even home freezers, it gives the owner a means of continuously checking temperature by merely glancing at the easy-to-read dial of the instrument which is provided with five feet of capillary tubing so that it can be located at any convenient viewing point outside the unit. No need to open doors or remove lids. It also provides a thermometer, combined on the same dial, to indicate room temperature. The upper ("freezer") scale reads from —30° to +65° F.; lower ("room") scale, from +20° to +90° F.

The large easy-to-read figures and markings are a part of the handsome styling throughout. Case is black enameled with chromium rim. Capillary tubing is slender enough to pass between the door and jamb of any type of refrigerator or quick-freeze unit. A convenient mounting bracket is provided so that installation can be made in a few minutes.

Duo-Therm is a "natural" for your customers who operate locker plants, commercial boxes, quick-freeze and storage units in plants, food stores, and homes. It is the finishing touch to every refrigeration job—the constant indicator of the functioning of the refrigeration unit—the safeguard against food spoilage due to power failure, mechanical failure or improper operation.

Write for complete descriptive literature

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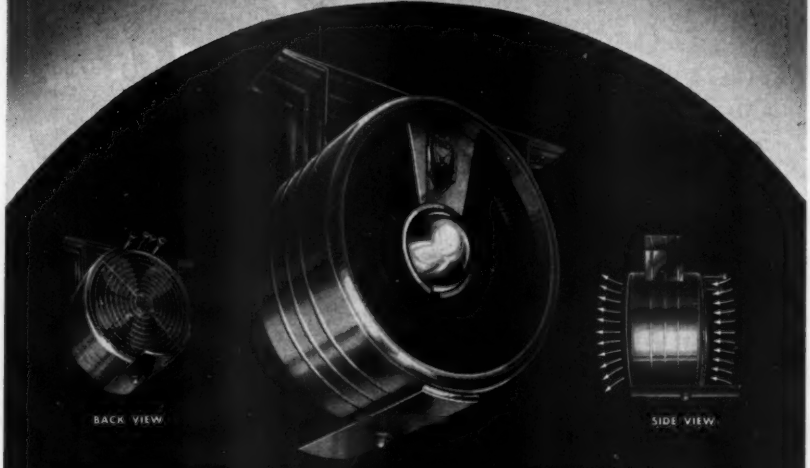
MARSH BUY FROM YOUR WHOLESALER

Refrigeration Instruments

NEW UNIT COOLER

ONE OF THE BIG THREE OF 1948



● This is the streamlined beauty with motor mounted in the center of its Round Coil—the new Peerless "Pie Plate" where all the primary and secondary surface is IN THE AIR STREAM. The fans are round—why should coils be square? Even the return bends on this coil are in the air stream. There is no waste surface. The Unit Cooler is a condensed package of refrigeration power, occupying small space for capacities given. Unfailing mechanical performance creates gentle air velocities for dependably efficient cooling, producing superior performance at minimum operating cost. Installation is an easily accomplished, one-man job. For use in all types of fixtures and walk-in coolers where general refrigeration is required. Complete with built-in heat exchanger and suction spinner.

Model No.	List Price	Capacities B.T.U. per Hr. at Given T.D. Between Air and Refrigerant			Motor and Fan Characteristics				Overall Dimensions Including Motor			Connections		
		1°	10°	20°	Motor H.P.	R.P.M.	Fan Size	C.F.M. Capacity	Height	Width	Depth	Liquid	Suction	Drain
66	$59.15	65	650	1300	1/100	1550	8	210	13	11⅞	6½	⅛	⅛	⅛
96	70.50	95	950	1900	1/100	1550	8	200	13	11⅞	8	⅛	⅛	⅛
126	80.00	125	1250	2500	1/100	1550	10	350	15	13⅝	8	⅛	⅛	⅛
226	110.45	225	2250	4500	1/30	1000	12	540	18¼	17⅛	8½	⅛	⅛	⅛
326	130.00	325	3250	6500	1/30	1000	12	500	18¼	17⅛	10	⅛	⅛	⅛
456	160.00	450	4500	9000	1/30	1000	16	1050	21⅜	20¼	11	⅛	⅜	⅛
606	190.00	600	6000	12000	1/30	1000	16	1000	21⅜	20¼	14	⅛	⅜	⅜
906	248.00	900	9000	18000	1/6	1140	20	1800	30	28½	12	⅛	⅜	⅜
1256	326.00	1250	12000	24000	1/6	1140	20	1700	30	28½	15	⅛	⅜	⅜
1856	387.00	1850	18500	37000	1/6	1140	24	3000	42½	41	13½	⅛	1" O.D.	⅜
2456	460.00	2450	24500	49000	1/6	1140	24	2800	42½	41	16½	⅛	1" O.D.	⅜

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FOR USE WITH FREON, METHYL CHLORIDE AND SULPHUR AS REFRIGERANT

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Check with Ranco FIRST...

- Specialists In Refrigeration
- More Ranco Controls In Use
- Dependability
- Less Stock To Carry
- Greater Customer Satisfaction
- More Profit For You

..and Check with Your Ranco Wholesaler

Your Ranco wholesaler carries the complete line of Ranco Refrigeration Controls, each type designed and built for a specific type of service. For the dependable, trouble-free service that keeps your customers satisfied—and increases your profits—check with your Ranco wholesaler first.

Ranco Inc. COLUMBUS 1, OHIO

World's Largest Manufacturers of REFRIGERATION CONTROLS

THE REFRIGERATION SERVICE ENGINEER

The National Magazine of Refrigeration Sales, Service and Installation

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NEW KINETIC PLANT

Increases "FREON" Production 60 Per Cent!

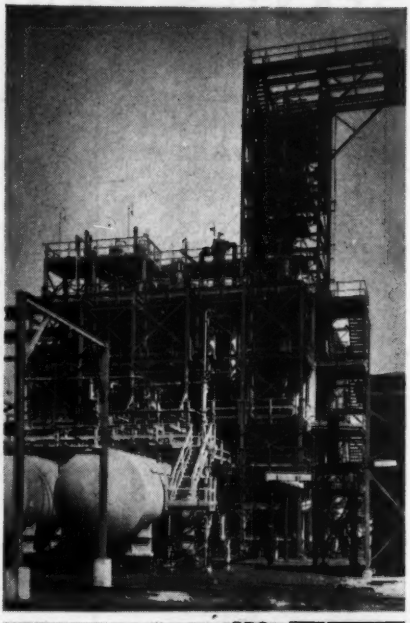
General view of the new and thoroughly modern "Freon" plant (top photo). Recently completed . . . it is in operation at East Chicago, Indiana. The structure houses the many highly specialized installations required to produce "Freon" safe refrigerants and propellents.

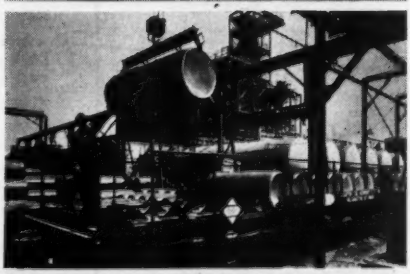
The new plant increases total production of "Freon" approximately 60 per cent. This will make available enough "Freon" to meet steadily growing demands and eliminates any necessity for stock piling by users. Center photo shows a few of the instrument panels which give minute-by-minute control of the precision "Freon" syntheses.

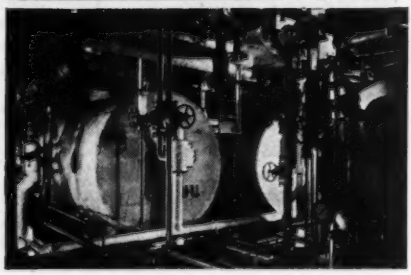
The maze of pipes, valves, tanks and gauges seen in the lower photo is typical of equipment used in making "Freon." Great technical skill and engineering "know how" in production . . . in addition to painstaking laboratory control . . . insure the uniform quality of "Freon."

This constant high quality contributes to the long life and satisfactory performance of equipment designed to utilize these superior products. Kinetic Chemicals, Inc., Tenth and Market Streets, Wilmington 98, Delaware.

Empty cylinders in which to ship "Freon" are still urgently needed. Please return empties promptly.







IN THIS ISSUE

IT HAS been quite some time since we had one of these intimate human interest stories on the trials and tribulations of the marine equipment trouble shooter. On page 31 of this issue, Donald F. Daly who tells these stories so well, begins another of his interesting experiences in this work. For informative reading of an entertaining nature see "It Drives You Crazy—It Gives You a Lift—That's Trouble Shooting."

THE success of some men in business can be of interest to us only when we are able to learn how success was gained and obtain some pointers which may be applicable to our own business. Thus the reason for such stories as the one appearing on page 45 entitled "$90,000 Gross on $2,000 Investment in Two Years." It tells about the company's growth, its business policy and plan of action.

SOME idea of the size and scope of the David Ranken School of Mechanical Trades of St. Louis, Mo., is given in a picture story on page 38.

THE installation and service of open type fixtures requires some considerations and precautions not encountered in the service of other display fixtures, and because they warm up very rapidly when trouble develops, prompt service is highly important. Walter E. Patten, author of the article on the subject appearing on page 39, because of his position of Division Engineer with the American Stores Co., has had the opportunity of gathering some very useful service information on open fixtures. He endeavors to impart the results of his experience to the readers of the article "Installation and Service of Open Refrigerated Fixtures."

BECAUSE there are more appliance dealers in the field than the amount of available sales can support, we are soon due for a period of price cutting, stock dumping and business failures among dealers, which will make difficult times for the older, well established dealers. This is the prediction of Harry M. Kelley of Frigidaire in an article appearing on page 48.

MOISTURE migration problems and how it affects design of domestic refrigerators and home freezers is discussed in brief on page 49.

SHORT items throughout this issue contain basic information on how to figure the surface area and Btu. rating of fin and bare pipe coils. The first one, "Calculating Surface of Fin Coils" is on page 59. The second one appearing under Service Pointers is on page 61, entitled "Bare Copper Tube Coils."

THE first part of an article on the installation, service and operation of the Tecumseh hermetic unit appears on page 50. It is taken with permission from the Tecumseh manual supplied manufacturers of refrigerators, freezers and other appliances equipped with these units, but contains useful service instructions. It is good reference material.

COVER

SHOWN on our front cover this month are blocks of dry ice coming off the presses of the recently expanded Saltville, Virginia, plant of Mathieson Chemical Corporation, formerly the Mathieson Alkali Works. A 30 percent increase in the facilities of this company's plant make it one of the largest in the world.

POSITIVE sealing of refrigerant provided by bellows-type shaft seal. Readily replaceable parts.

QUIET operation assured by dynamic balancing of flywheel and one-piece design of suction fan.

UNDIVIDED RESPONSIBILITY. Entire unit, including the J & H motor, is warranted by Jack & Heintz.

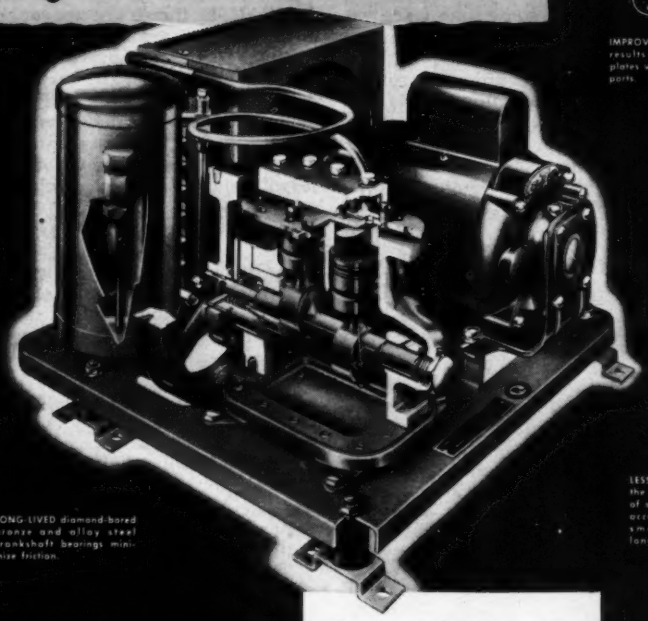
Anatomy of a star salesman

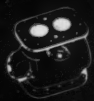
IMPROVED PERFORMANCE results from steel valve plates with shallow valve ports.

EXTRA LARGE receiver of seamless steel has ample storage capacity for refrigerant.

LIGHTWEIGHT aluminum pistons, with specially designed rings, minimize reciprocating forces for smoother operation.

STRONG, one-piece, forged alloy steel crankshaft. No inserts, set-screws or assemblies to work loose.





LESS FRICTION throughout the compressor because of super-fine finishes and accurate fits . . . means smoother operation, longer life.

LONG-LIVED diamond-bored bronze and alloy steel crankshaft bearings minimize friction.

Better condensing units through

JACK & HEINTZ

Mass Precision

Compare J & H Condensing Units with any other design and you'll find that they are unsurpassed in features that *help you sell!* Every part packs a sales punch to win business for manufacturers and dealers of refrigeration equipment. Manufactured to the finest precision standards and thoroughly tested by rigid Jack & Heintz methods, the parts, subassemblies and completed units *prove* that they are *tops* in smooth, efficient operation. That's why J & H Units have won such a dominant place in the refrigeration industry. Write for full information on ¼, ⅓ and ½ h. p. J & H Units.

JACK & HEINTZ JH PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

"I enjoyed the trip out to the ship. If I had known what was in store for me I'd probably have jumped overboard."

It drives you crazy—It gives you a lift

That's Trouble-Shooting

By DONALD F. DALY

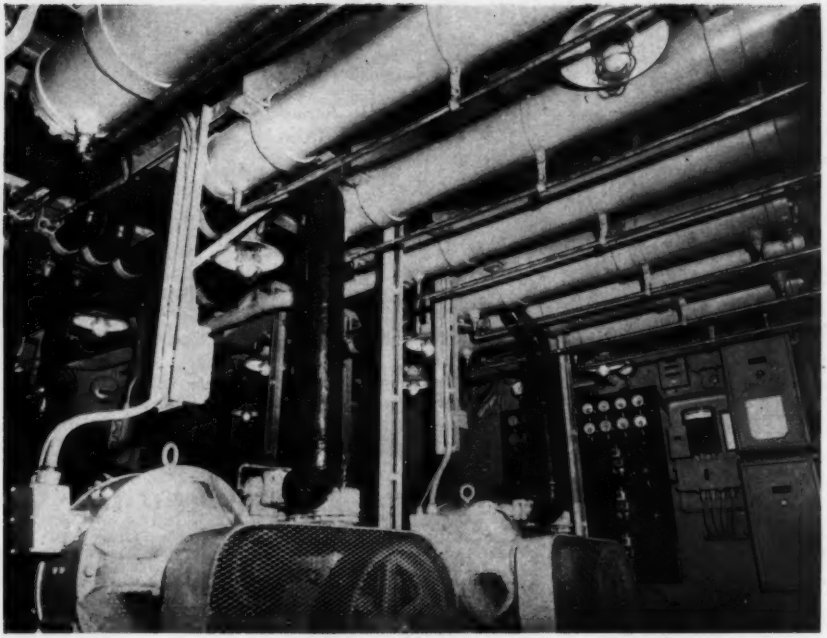
REFRIGERATION service engineers are mercurial sort of guys, sitting on top of the world one day and down in the dumps the next. Just give a refer man a run of tough jobs and he will get so low that he won't even talk refrigeration. Which is saying quite a lot because most refer men would rather talk refrigeration than eat when they're hungry.

But let this same refer man hit a hot streak, which we all do at times, and he will proclaim loud and long that he is the best trouble shooter in the business. He is Old Man Refrigeration himself. No job too large. No job too tough. Just lead him to it and your problems are solved.

A few months ago I got into one of these slumps. I ran into one sticker right after another, and to make matters worse I had just gone to work for this outfit and had not had a chance to prove my ability. After I had been in this slump for a few days I got so I was afraid to stick my head in the office for more calls. The other servicemen kidded me a little, but not too much. I guess they were afraid I would bite them. Maybe I would have at that. The service manager wasn't giving me any trouble. He was an old-timer and had been through the mill himself. Anyway, I hadn't been hired to do service on domestic units. My specialty is large commercial and marine installations.

Things got so bad that I had about made up my mind to quit the job when the service manager called me in and told me that he had a call on a ship that was laying at anchor out in the Bay. He had arranged for a launch to take me out to the ship and I was to leave at once. It was an emergency call. I was pretty happy about this. Here was something right down my alley. "I'd show these guys I could shoot service."

I gathered up my equipment and the shop man drove me down to the pier where I was to catch the launch. It was a beautiful day and I enjoyed the long ride out to the ship. If I had known what was in store for me I'd probably have jumped overboard. As soon as we



If you have never worked on a ship you will not believe how much equipment can be packed into one small room. Every inch of space on decks, bulkheads and overhead is utilized. There is barely enough room to get around.

got out to the ship and I got my gear on board I looked up the Chief engineer. He was very glad to see me.

"I just signed on this ship," he said, "along with all of my crew and none of us has ever had any experience with this type of refrigeration plant. That's why we called you in. We have a small plant which takes care of the ships stores refrigeration, but the plant which takes care of the cargo refrigeration is shut down and we have to get it in operation right away. In fact, we are supposed to start loading refrigerated cargo tomorrow morning at ten o'clock. Can you have the plant in operation and the temperature down by then?"

I assured him that I could. If the plant was in good condition and had been operating all right before it was shut down, I could get it going in plenty of time. "If I'd only known. Some of these days I'll learn to keep my big mouth shut and to look before I leap."

After I had gotten all the information I could from the Chief I went down to the refrigeration machinery room. If you have never worked on ships you won't understand the set-up. Space is at a premium on ships and the machinery rooms are small. Every inch of space on the decks, bulkheads, and overhead, is utilized. There is just barely room to get around. Frequently you will find from three to six condensing units, and everythings that goes with them, in a room not much larger than a good sized kitchen.

I got my first surprise when I got down to the machinery room. There were three large units, the like of which I had never seen before. I examined the name plates and found that they were manufactured by one of the major companies. Two were ten ton units and one was fifteen tons. Anyway, that's what I figured them to be, judging by the horse power of the motors. In marine work you can just about figure tonnage on a three to one basis.

The piping hook-up was typical of marine refrigeration. All three units were cross-connected so that any unit could pull on any or all loads. The piping on these cross-connections was more or less exposed, so I didn't anticipate any difficulty in tracing that out. But where I got the surprise of my life was when I looked at the liquid and suction distribution manifolds. All of the piping from the various coils was brought into one panel which covered one entire wall of the room. I have never seen such an array of valves in my life. These valves were all covered with block cork with just the valve stems sticking out. Here is where I nearly passed out! "There wasn't a tag or a hand wheel, or a marking of any kind on any of these valves."

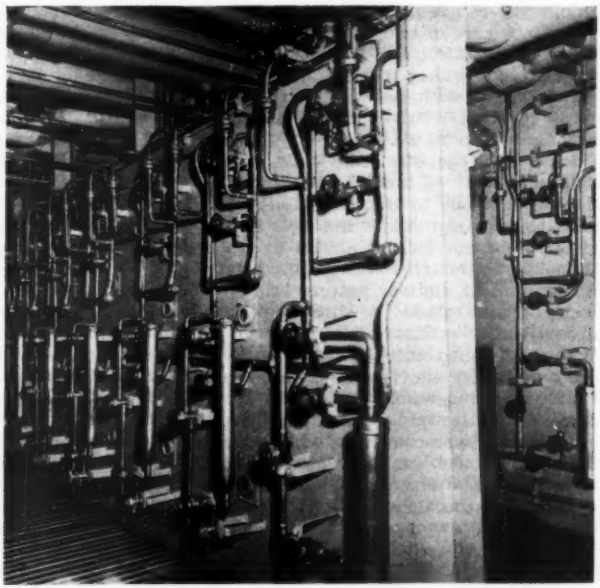
I immediately hurried back up to the Chief engineers room to get the instruction book that is always furnished with these installations. Here's where I got shock number two. The Chief didn't have the instruction book, or any blueprints of any kind. Apparently the last Chief had taken them along when he quit.

"Look, Chief," I told him. "I don't see how I can possibly get the plant in operation without some sort of blueprints of the piping. You'd better send ashore for the book, and you had better try to get the manufacturers agent out here too. I'll do what I can in the meantime, but it will be a big job to trace out all those lines. As a matter of fact I don't know if I can do it."

He agreed to do this, but urged me to go ahead and do what I could. The refrigerated rooms were in the after part of the ship so I went down there for a look around, and here I got shock number three—there weren't any tags or markings of any kind on these valves either. Well, all I could do was try, so I set to work.

I went back to the machinery room and closed all the valves on the fifteen ton unit except the discharge service valve and checked the controls. The low pressure switch cut out at 2 pounds and cut in at 12 pounds. This seemed about right to me. I checked the high pressure cut out and it kicked the motor off at 125 pounds. This was about right too. So far so good.

I went back to the refer rooms and closed every valve on those panels. Then I went back to the machinery room and tried to trace out the lines. I did discover that one section of valves was for the hot gas defrosting, so I closed these valves. Then I set what I thought were the right valves on the cross-connections. Now I was ready to go. I opened the compressor service valves and started the motor. The unit ran for about three minutes and shut off on low pressure. O. K. so far.



Take a panel board like this one with no tags on the valves and no blueprint of the piping layout or manual of instructions and try and work it out. You will get the idea.

Now I went back to the refer rooms to start opening valves. In order to get to the refrigerated rooms I had to go up two decks, walk aft about one hundred feet, and then climb down two decks. I'll bet I walked twenty miles up and down those ladders before that night was over.

There were three large rooms. Two were evidently used for meat storage and were held at 10 degrees. (I figured this out from penciled notations on the walls.) The other room was used for vegetable storage and was held at 40 degrees. All three rooms had double banked pipe coils all around, and two large blower coils. It looked like a fine outfit.

I opened up a couple of coils and went back to the machinery room. The unit was running, but it short cycled. I went back and opened up some more coils. The unit still short cycled. Back I went to open up more coils. By this time I was getting some frost on the liquid lines and was getting a pretty good idea of the piping layout. I had all of the coils on the two meat rooms cut in now, but the unit still short cycled.

I decided to look over the expansion valves and solenoid coils. There were eighteen expansion valves and nine solenoid valves. Apparently one solenoid valve took care of two expansion valves. Examination disclosed that two of the solenoid coils were burned out. I replaced these with new ones from the ships stock of spare parts. Everything else seemed to be all right.

I cut the vegetable room coils in and started up one of the ten ton units. (I figured that one of the small units was used as a spare.) All of the coils in the vegetable room frosted almost at once. It looked as though I was getting things under control. It was getting late so I went up and talked the ships cook into giving me a handout and some coffee. When I finished eating I went back to see how things were going. The ten ton unit on the vegetable room was doing fine. The coils were all frosted and the temperature was coming down fast, but I could see that I was in for more trouble with the fifteen ton unit. The unit short cycled and the temperature had come down only a few degrees. Must be short of Freon. I closed the liquid line valve on the receiver and let the liquid back up. Sure enough, there wasn't half enough Freon. Well, if the Freon had gotten out there must be leaks. I lit up my leak detector and started leak testing the plant. I didn't find any leaks in the machinery room, and the air was clear in the vegetable room, but, brother, there were plenty of leaks in the two meat rooms. Most of them on the coil connectors, which were silver soldered. The ship had an acetylene welding outfit so I went to work. It took me until two in the morning to find and fix all the leaks and, believe me, I wasn't letting any grass grow under my feet.

When I got all the leaks repaired I dumped in two 145 lb. drums of Freon and kicked off again. I really got results this time, but not in the way I expected. The compressor ran fine for a while and the temperatures were coming right on down. In less than two hours the temperature was down to 34 degrees and I was beginning to think that I was doing all right, but the damn thing wouldn't go any lower than 34 degrees. The compressor was running all right, but it didn't seem to be pumping. "Now what the hell? The compressor acted like it had slipped into free-wheeling. It would just sort of spin. I knew the oiling system was important so I checked the oil level and gauges. They seemed to be O. K. and the pressures were constant. I couldn't figure it out. It acted like an old fashioned water pump that had lost its prime. I was about ready to give up. It was almost 6 A. M. and I had been on the go for nearly twenty-four hours.

I was getting pretty tired and discouraged by this time, and to make matters worse the Port Steward (He's the guy who has charge of all the refrigerated cargo and stores for the ship.) came aboard and started giving me a bad time. He didn't get far. By now I was in a mood to pull his leg off and beat him to death with the bloody end. I told him off, quick.

I checked the compressor again and again and finally I came to the conclusion that it must have some sort of an unloader device that partially cut the pump out when the back pressure got down to a certain point. The unit on the vegetable room was all right. It had cycled normally several times and the solenoid was cutting out the desired

temperature. But I couldn't get the meat rooms below 34 degrees.

I was really stuck now. There was plenty of refrigerant in the system and the temperatures were O. K. for the pressure I was getting on the suction side. The pump would pull the back pressure down to about 15 pounds and then it would start to spin or slip into free-wheeling, or whatever you want to call it. I didn't know what to do. If I tampered with anything without knowing what I was doing I might really gum up the works. As things stood I could hold the temperature I had and maybe get them down another few degrees. "What a spot to be in. My reputation would really be shot to Hell after this deal."

Down in the Depths

I went up to tell the Chief the score and to see if he had any suggestions to offer. He was very decent about the whole thing. "I want you to know," he said. "That I appreciate what you have tried to do, and you have accomplished a lot by repairing the leaks, changing the burnt out solenoid coils, expansion valves, etc. In fact, under the circumstances I think you have done pretty well."

I refused to be consoled. "In my book you either do a job right and put the plant in proper working condition or you have failed. If I could only find that damned service manual. I know there must be one somewhere about. They always furnish at least two copies with all marine installations." Well, the Chief didn't seem to be worrying too much. Yeah, Why should I be excited? I could always go back to punching cattle."

I dropped down to the Petty Officers mess for a cup of coffee and while I was sitting there I happened to notice the small shelf of books that is always found on merchant ships. I opened up the case to see what sort of books the good people were donating to these libraries these days, and there, big as life and right on the top shelf was the double damned, triple plated manual for the ship's refrigeration plant.

It was a big book and told just about everything there was to know about the installation. Including diagrams of all the piping and manifolds. If I'd only had it at the start I could surely have saved myself a lot of work. It didn't take me long to find the section on the unloader device. It was a very simple device.

Here is how it worked. I won't give you the full text of the instructions, but the idea was—when back pressure had been reduced to a predetermined point, (Which could be changed by an external adjustment.) the unloader unseats the suction valve and holds it off the seat. Thus causing one cylinder to stop pumping. On a five cylinder machine, such as this one, it would gradually unload all of the cylinders but one. For instance, say that the rooms were warm and you started with a back pressure of 40 pounds. As the temperature was reduced and the load on the pump became lighter—in order to maintain fairly constant operation of the compressor—the first cylinder would cut out at 12 pounds, the second at 9 pounds, the third at 6 pounds, and the fourth at 3 pounds. Thus leaving just one cylinder to pull on down to the cut out point of the low pressure switch. Which in this case was 2 pounds. A very simple and effective device.

Success

When I had read the instructions over several times I went down to the machinery room and checked the pressure at which the compressor started to "spin". Sure enough the unloader was set to cut out too high. After some experimenting I got the unloader set about where I thought it should be. I got results almost immediately. The pump went right to work and the temperature of the meat rooms started to drop. I have never seen a plant pull down so fast. In less than a hour I knew that I had everything under control. Oh, Brother. What a relief.

I went up and told the Chief the good news and he was very happy to know that the plant was operating all right. He wanted to sign me on as refer operator, but I wouldn't go for it. It was now 10 A.M. and I asked the Chief to have the signal flag hoisted so that one of the launches would stop for me on its next trip.

The Chief put a watch on the plant

and had one of his men take my tools up on deck. While I was waiting for the launch two tug boats, each with a huge barge in tow, came alongside. The barges were loaded with refrigerated meat and vegetables. When I got a look at all that food I almost passed out. Boy, that was a close one.

The launch finally came to pick me up. I was dog tired, but I felt pretty good. A tough job, but that's the way I like 'em. They don't come too tough for me. There may be better trouble shooters around this country, but I haven't run into them lately. Well, I'm a refrigeration serviceman again, and admitting it. So I guess everything is all right. Wait until I see those wise guys back in the shop. I'll make 'em eat those smart cracks.

Tailor the Installation to the Job

By HARRY L. SPOONER

WHILE there are many refrigeration installations, especially in the standard sizes of meat cases and similar installations, that are for the same purpose and seemingly would require the same kind and capacity of refrigeration, there is still a difference in their requirements. In making these installations, the mere salesman usually follows a standardized practice. With him an 8-foot case takes the same capacity compressor wherever found. That is what marks the differece between the salesman and the engineer. With W. O. Luttrell, registered professional refrigerating engineer, Galesburg, Ill., every job is a custom-made job.

Mr. Luttrell, whose business is at 77 South Seminary street, operates under the name of Refrigeration Products. He does a general contracting business in refrigeration and air conditioning and is distributor of Frigidaire commercial and industrial refrigeration.

Mr. Luttrell installs refrigeration for hotels, restaurants, taverns, locker systems, packing plants, frozen food plants, bakeries, fur vaults, etc. Although doing a general refrigeration contracting business, recently he has made more installations in packing plants and locker plants than in any other one line. Another line which is increasing is that of installations for fur vaults.

"With us," says Mr. Luttrell, "every job is a custom job. Even though one customer may want an installation for the same purpose as some other one, there are always some points in connection with his installation that may be different—he may have a heavier service load than his competitor across the street. Even though the same type of service, the volume or service load may vary considerably. Therefore it requires a difference in the capacity of the equipment to properly handle the job.

"For instance, a standard 8-foot meat case under normal application, may require a ¼ hp. condensing unit. But if the volume of trade is extremely high, the service load would naturally be considerably larger—therefore it would require equipment of a greater capacity to properly handle it.

"Many problems arise from the attitude of the buyer. Many buyers get preconceived ideas of what they want because somebody has told them. They expect to get the best results from an installation that we know will not give them these results. We then have the double problem of fitting an installation to the requirements of the job and at the same time must overcome the preconceived ideas of the buyer. In other words, we have to engineer a job for the buyer's particular application and also have to use engineering psychology to fit the installation to the buyer himself. We have to gain the results he wants and at the same time be sure the job is right from the engineering standpoint. If we can't do both, we don't want the job.

"We can't take chances on our reputation. We guarantee everything for a year. We mean by this that the installation must not only be satisfactory to the buyer but also that we must be satisfied that the results are what we expected.

If a customer still insists that we do the job according to his ideas, or nothing, he gets nothing from us.

"We sell only high quality merchandise and install it in accordance with the best accepted practices of good engineering. There are enough headaches even with a perfect installation. Therefore we feel we would be doing ourselves an injustice by installing a job that in our opinion is not based on sound engineering principles.

"Ninety-eight per cent of all customer dissatisfaction and abnormal service expense is caused through no fault of the equipment itself—it is caused by poor engineering and misapplication of the equipment installed.

"We take a long-range view of this because we know that customer dissatisfaction will ultimately put one out of business even though he does the installing according to the customer's ideas.

"Too many contractors, in order to get a job, cut down the bid and then to make a profit, install less equipment. That means the customer pays for something he didn't get and almost invariably breeds customer dissatisfaction.

"In connection with air conditioning, there are a tremendous number of people who have no idea of the cost involved and also, when given the answer to their first question 'What does it cost?' almost faint away. Until they are told differently, they think air conditioning should involve only a small expenditure and then when told, are shocked at the investment required. Many prospective customers who have never asked for quotations until this year will not buy this year. They must have time to recover from their shock and resign themselves to the fact that air conditioning runs into money. Right now we are making an installation that has been under consideration for three years."

Mr. Luttrell uses several methods to secure business. His territory embraces about seven counties in western Illinois. Because there is still a shortage in some kinds of equipment, he is able to sell all the equipment he can get within this territory. He does an extensive job of direct mail advertising to a mailing list of business places where either refrigeration or air conditioning can be used—this includes every type of business or profession.

He employs two salesmen who are constantly calling on prospective customers. The direct mail advertising acts in two ways to help these salesmen. It provides some prospects by means of inquiries received in response to the mailing and it also paves the way for the salesman's call on those who do not respond with inquiries to the mail pieces.

Prompt and efficient service has always been an important factor in the success of the Luttrell business. Five men are constantly employed in installation and service work. Only men well experienced are employed. Because no service is given on household refrigeration, the service personnel are always available for any emergencies in industrial or commercial refrigeration.

In the majority of cases, Mr. Luttrell draws a complete floor plan of the building the customer is to occupy. In many instances he has designed and supervised the building of complete plants from the vacant lot to the finished building.

The most recent of the latter is the Nesbitt packing plant at Aledo, Ill., just completed. This $60,000 plant is completely modern in design and equipment. It consists of holding and knocking pens, slaughtering facilities and equipment, a large chill room, an ageing room, a sharp freezing room for processing food products for home lockers, and a retail meat department.

A five-ton condensing unit maintains a temperature of 33 degrees in the chill and ageing rooms while a three-ton unit maintains a 20 degrees below zero temperature in the sharp freeze room. The chill and ageing room are equipped with a blower of sufficient capacity to maintain the 33 degrees of temperature mentioned and at the same time to maintain a rather high relative humidity, which determines to a great extent the shrinkage that is usually encountered in many other coolers of this type. Mr. Luttrell also furnished the complete curing equipment, which consists of lard rendering, and pickling and smoking.

The plant is equipped throughout with electric hoists and overhead track arrangements which enables one man, if

(Continued on page 96)

David Ranken School of Mechanical Trades

THE David Ranken, Jr. School of Mechanical Trades, St. Louis, Mo., ranks among the most respected schools in the country. Founded in 1907, it is an endowed, non-profit institution with a total enrollment for all departments, both day and evening classes, of 3100.

Largest of the 14 departments of the school (pictured here) is refrigeration which is considered a highly skilled and technical craft, and treated as such. Academic subjects required and involving 40% of the 18 months' course include English, Mathematics, Science, Drafting, Industrial Relations, Personal problems and Safety.

Shopwork is tied in closely with the class room work and students are kept abreast of latest developments and trends. For example: With the trend toward lower temperatures, Ranken has realized the necessity for training in this field. A piece of unusual equipment has been built for this purpose and is proving a good training device. In this unit the evaporator is 100 feet of ⅝ inch tubing wound in a cylinder of 1-½ cubic foot capacity. The cabinet is insulated with 12 inches of cork on all sides. The condensing units are two Kelvinator model "R", one and one-half horsepower units, and one model "K" Frigidaire one-third horsepower unit. These machines were completely reconditioned by Ranken students. The two Kelvinator units are used for first and second stage compression, with an oil separator after each stage. The first stage compressor operates at 742 rpm., and the second stage compressor at 514 rpm., both using 300 viscosity oil. The model "K" Frigidaire unit subcools the liquid refrigerant through the medium of a heat interchanger before entering the expansion valve.

These old SO_2 compressors were selected because of the long piston stroke. The two Kelvinator units are charged with "Freon-22" and the Frigidaire units on the subcooler with "Freon-12." The refrigerant metering devices are a Detroit No. 793 differential temperature expansion valve for the evaporator, and a Detroit No. 672 A.E.V. on the heat interchanger. This interchanger is a 12 foot length of ⅝" copper tubing with a ⅜" liquid line wound inside.

The valves and the counterflow subcooling interchanger are housed in a small cabinet on the end of the main cabinet. This valve compartment is maintained at approximately minus 10 F. to precool the operating valves and hold temperature drop losses to a minimum.

The liquid refrigerant is precooled to minus 65 F. by the interchanger before entering the temperature differential expansion valve. It is possible to drop the temperature 150 degrees from room temperature within the first twenty minutes of operation. The lowest temperature that has been reached with this machine is minus 158 F.

The electrical control system has been designed to operate each unit separately, or to cycle as a complete unit.

A typical installation of self-service display cases in a small market in Philadelphia, Pa.

Installation and Service of Open Refrigerated Fixtures

By WALTER E. PATTEN*

IT IS NOT within the scope of this article to analyze the applications where open refrigerated fixtures should be used as contrasted to closed fixtures, whether service or self-service. Each store or market requires individual study, relating to location, size, and type of customer. Business may be constant through out week and day or may be a location where greater part is done during two hours each day or one or two days each week.

Self-service fixtures permit handling large volume in rush periods, provided customer confidence is maintained. It is a prime requirement that any item sold packaged in a self-service case be of prime quality. Where the customer knows that there is no question as to quality, he (or usually she) will shop with remarkable speed, and with minimum fumbling or disarranging of merchandise in fixture.

The smallest corner stores are using self-service fixtures for frozen food and produce. Self-service on meat is gaining wide acceptance, but appears to be most applicable on larger markets. A cooled cutting and prepackaging room, 50 to 60 F. is needed. The installation and packaging cost for self-service meat pretty well confines the application to markets doing a minimum meat business of $2,000 per week.

Installation

Even with the best designed open refrigerated fixtures, there is much greater heat loss, or cold loss depending on the viewpoint, than with the closed fixtures encountered in the past. Much of this is due to the fact that the top is open, but part is caused by the much greater light intensity provided together with the equivalent heat, and also from the continuously operated strip heaters employed to keep side glass, price tag molding, and display pictures from sweating.

This greater heat load characteristic of open fixtures, means larger condensing units than used with equivalent size closed fixtures, and fixture manufac-

* *Division Engineer of American Stores Co. Member of R.S.E.S. Monumental Chapter in Baltimore, Md.*

turer's recommendations for condensing unit size must be adhered to closely. In the old days, we used a ⅓ hp. air cooled unit on a reach-in dairy 6 ft. long. Today a 6 ft. long section of open shelf or tier type dairy fixture requires a ¾ hp. water cooled condensing unit. When one considers a self-service market with 100 to 150 lineal feet of open refrigerated cases, several walk-in coolers, and a cooled cutting room, it should not be too hard to understand why 10 to 20 condensing units will be required.

Do not make the mistake of connecting more than approximately 20 lineal feet of self-service fixture on one condensing unit unless the refrigeration service man is available on very short notice. In a self-service market the merchandise has to be in the fixture or no selling can be done. When the refrigeration system fails, open fixtures warm up rapidly. If refrigeration is not restored in two hours at most, merchandise must be taken out of the fixture and put in a storage box. The moral of this is: No refrigeration, no sales; no sales, no profit; no profit, no happy owner. No more than two fixtures on each condensing unit is the best way to avoid such unpleasant circumstances occurring.

Practically all manufacturers of open fixtures warn against connecting them on the same condensing unit with closed fixtures. Their advice in this respect should be adhered to. As a temporary measure during alterations, we have operated the two types on the same compressor, but only as an emergency measure.

In referring to the fact that open refrigerated fixtures warm up rapidly when the refrigerating system fails, all dealers who have sold any quantity of open fixtures, particularly frozen food cases, should consider that these fixtures can create a merry service problem unless you have a service staff of adequate size and good flexibility. Calls of "No Refrigeration" on these fixtures cannot wait until "tomorrow". Owners of open equipment are good prospects for service and inspection contracts, and the dealer who fails to sell them service contracts may be a sorry chap when he cannot answer all of his service calls within a few hours.

In making refrigerant connections to open cases, the same commandment that applies to all fixtures applies: "Never locate a joint where it cannot be reached for test or repair." Some fixtures de-

The problem of always placing connections in an accessible location can sometimes be solved by placing the fixture next to a partition as shown above, then drawing the tubing through the partition and making the connection where it is readily reached.

signed to go against wall have tube connections provided through rear side of fixture. It will be wise to cut off the tubing inside fixture to bring joint inside where it will be accessible without moving fixture or tearing out building wall.

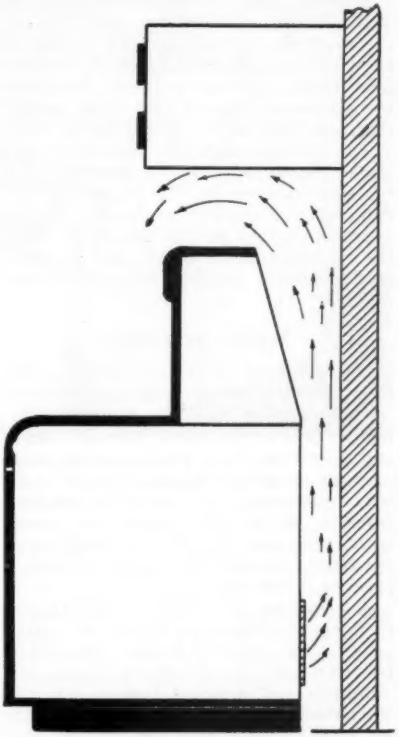
Since a certain portion of room air is mixing with the atmosphere of an open fixture, there is considerably more condensation to be drained away than from the closed type. It is good practice, and legally required in many cities to connect drains to each fixture no smaller than one inch pipe size. Main drain lines should not be smaller than two inch pipe, and should be provided with cleanout connections. Most open fixtures have drain connection at or near floor height, and in order to allow drain lines to have ¼" per foot slope, drain layout may present a major problem. Where building has no basement, some costly digging and floor repair may be involved. Where sewer connections are close to surface, fixture layout may be influenced by available drain connections.

Drafts

The successful operation of all open self service fixtures depends with no exceptions, that no drafts or air currents blow over fixture. Cold air will stay in an open top fixture just as water stays in a pan or basin, provided that no draft blows across top of fixture to blow cold air out. These facts must be kept in mind continually when locating individual fixtures. In planning markets using all open fixtures, the entire heating and ventilating and air conditioning system if used, must be designed to prevent air currents blowing into or directly over fixture.

Fixtures having self contained air cooled condensing units frequently discharge hot air from condenser fan upward between rear of cabinet and wall. Such fixtures must not have canopies built over them unless a chimney is built to pass this hot air up wall through canopy. If canopy stops upward travel of air, the hot air will be deflected down again into fixture and unsatisfactory temperatures will result. This problem is commonly encountered now that canopies and similar super structures are popular. Such super structures can be beneficial to protect fixture from air currents from above.

Fixtures having natural draft coils can be draft tested as follows: Blow tobacco smoke lightly into fixture. Smoke should spread out as a layer or strata and remain so for one to three minutes. If smoke swirls or billows and disappears, fixture cannot operate to protect contents, as this in an indication that draft is blowing most of cold air out of fixture.



Fixtures with self contained air cooled condensing units must not have canopies or other super structions built over them. Hot air discharged from the condenser will be deflected downward into the display fixture and unsatisfactory temperatures will result.

Fixtures having forced draft coils using fan can be tested by moving a lighted candle around rim of fixture and note if flame is blown over horizontally when held still. Such action of flame will show presence of air currents and their direction. If merchandise is piled above "fill

line" to obstruct cold air circulating slots, air from coil can be diverted out side fixture and produce unsatisfactory temperatures.

Food kept in these open fixtures, when subjected to drafts, or excessive air movement will spoil quickly. While some frozen foods may not spoil, they will loose all taste and discourage customer from buying again.

Another very important result of drafts blowing on these cases is that the store electric bill may go so high as to wipe out all profits. Open fixtures have motors and compressors operating them that are two to four times larger than size used on closed fixtures of same size or storage capacity. Electricity and water consumed by condensing units running excessively due to drafts, can run these operating costs up several hundred dollars per month above what the cost should be where one hundred or more lineal feet of these fixtures are involved.

Source of Drafts

One common source of drafts on fixtures is from forced draft unit heaters. In winter their effect is doubly detrimental when they blow hot air. Many stores operate these heater fans in summer for so-called cooling. We have always questioned this use of heater fans because, while they create air movement, they also blow hot air that would normally stratify at ceiling down to level of occupancy.

Another source of drafts on fixtures is floor or ceiling mounted air circulators. Use of these heavy fans should be confined to check-out area and definitely not directed toward fixtures. We have found these fans scavenging the air from fixtures fifty feet distant.

One might ask how can a market using open fixtures be cooled and not cause objectionable drafts. The best answer we can offer is to use exhaust fans on roof or in wall at rear of building. Naturally all doors and windows near fans must be kept closed, and ample air inlet openings allowed at opposite end of building to allow fans to draw air through building. These primitive instructions may seem superfluous, but we repeatedly see exhaust fan installations where no provision was made for incoming air, or where doors and windows near fans are left open to short circuit air in and out same wall.

Where duct type air conditioning is used, air discharge pattern and velocity must be designed not to blow air at fixtures. We have found several installations where open fixtures failed to function as soon as air conditioning system was started.

Condensing Unit Control Systems for Open Fixtures

Straight pressure control can be used where fixture temperature of 38 to 44 F. is acceptable such as on produce and dairy cases. Cut in pressure for Freon-12 should be set at 38 pounds gauge to insure satisfactory coil defrost. Cut out pressure will have to be determined by trial to secure desired fixture temperature, but will not likely be less than 13 lbs. or over 18 lbs. depending on coil to fixture ratio.

For cases holding fresh meats and lunch meats temperature should be held near 32 F. for longest storage life. Temperatures this low cannot be secured by defrost cycle operation with pressure control alone, and still secure satisfactory coil defrost. Common procedure is to add time switch (time clock) to stop compressor for two periods of 1½ hours each every 24 hours, 6:00 to 7:30 a.m. and p.m. Clocks giving one defrost period per day have been used but off period must be around three hours and undesirable warm-up of fixture occurs. When using time switch, the switch is connected in series with pressure control. Control must be set to cut in no higher than 28 lbs. on F-12 to prevent partial defrost during pressure "off"-cycle which will allow icicles to fall and refreeze to clog drip gutters. Cut-out pressure must be determined by test run for temperature wanted, and will not likely be below 6 lbs. or over 12 lbs. where temperature near 32 F. is desired. This same control system can be used for dairy cases and is preferred over straight pressure control. Cut out pressure will be higher for higher fixture temperature.

Some makes of open fixtures for use in the 32 to 38 F. range use a thermostat and time switch and electric defrost heater in each case. If there is but one fixture and one condensing unit, thermostat will stop motor when temperature

A common source of drafts on open fixtures is from forced draft unit heaters such as shown in the upper right corner of this photo. Louvers of these units often direct the flow of warm air downward on fixtures.

setting is satisfied. When time switch enters defrost period, it interrupts thermostat circuit to keep compressor off and at the same time cuts on electric heater to secure rapid defrost with little temperature rise in fixture. Where more than one fixture is on same compressor, thermostat on each fixture will close solenoid valve in liquid line of that particular fixture when temperature is satisfied and compressor must be operated by pressure control. Each fixture is defrosted by its own time switch connected in series with thermostat and solenoid valve. Cut-in setting for pressure control must be above 28 lbs. on Freon-12 and cut out setting must be low enough to keep compressor running until last fixture thermostat is satisfied, possibly as low as 2 lbs. Failure to set pressure cut-out low enough will result in control being taken away from one or more thermostats by pressure switch.

The same control systems using thermostat, time switch, etc. mentioned above are used for open type freezers in the minus 10 to zero F. range. External source of heat such as electric heaters, must be used for defrosting in this range. Multiple fixtures on same compressor is not recommended.

Moisture Problems

Open type freezers often run plate or coil temperatures as low as minus 30 F. Many service troubles from wax separation from oil can arise if care is not used to select a good wax free low temperature oil. Even greater trouble can arise from moisture. Both moisture and wax plug expansion valve and make diagnosis between the two difficult. These two problems arising with open freezers with their -30 evaporator temperatures, may be perplexing to the service man who never encountered them in any serious degree with closed freezers that seldom had evaporator

temperatures below zero or at the lowest minus 10 F.

Experience based on maintaining several hundred open type frozen food fixtures over 18 months indicates the following:

a. Do not locate a silica gel dehydrator near condensing unit in liquid line. When warm weather arrives, dryer may be exposed to temperatures around 100 F, and moisture previously adsorbed at lower temperature will be released into liquid line and plug expansion valve. Try answering 20 calls of no refrigeration on the first hot day of the season, and you will comprehend this advice fully. Dryers in this location have been changed as many as ten times with no permanent results. Where silica gel is exposed to temperatures around 80 F, it appears incapable of reducing moisture content of Freon-12 low enough to prevent moisture coming out of solution in expansion valve at minus 10 or lower.

b. Much more satisfactory results have been secured using silica gel dryers located inside freezer cabinet between heat exchanger and expansion valve inlet. At this location temperature of dryer usually remains 50 F. during running cycle, but even here completely perfect results will not be obtained.

Initial results of recent tests indicate that possibly the best location for dehydrator on these freezers is at expansion valve outlet, between expansion valve and evaporator. Only a dehydrator of exceptionally low pressure drop can be used at such a location without affecting function of expansion valve. Further it appears that moisture removal at this below-freezing location is not so much by adsorbtion as by filtering moisture crystals out of refrigerant stream, which action is probably one of the most effective means of moisture removal available.

General Suggestions

Where fixtures have electric heaters for defrost or anti-sweating purposes, be certain that electric circuit wiring is of ample size to supply current required. Such circuits must be alive 24 hours per day and not attached to some light circuit that may be shut off when store closes. This usually means fixture lights must be turned off by individual light switch on each fixture and supply circuit left on. Complaints of glass fogging when store first opens can frequently be traced to failure to comply with above requirements.

Where time switches (time clocks) are used to control defrosting, power interruptions, which are not unusual in smaller towns, will throw time switch out of synchronism and cause defrost period to occur during hours of rush sales.

Earlier in this article, reference was made to suction pressures as low as 2 to 6 lbs. with Freon-12 on medium temperature fixtures. Some readers might start to worry about low humidity and dehydration of food stored in reference to large temperature difference that may result at times between evaporator temperature and fixture temperature. The humidity in an open fixture does not require the consideration involved in a closed fixture. It is expected for all practical reasons, and required by law in most cities, that all food displayed in open-type fixtures be packaged or wrapped in semi-moisture proof container, transparent film, etc. Weight loss of food is in this way controlled without serious consideration having to be given to fixture humidity.

The usual reference to "air conditioned" cutting room has been avoided purposely. Air conditioning usually refers to temperatures between 70 and 85 F. Cutting and pre-packaging should be done in a room held between 35 to 40 degrees. Such temperatures are difficult to enforce because many employees, particularly women, refuse to work in temperatures this low unless hired with this fact specified. As a result many cutting rooms are being operated nearer 55 F. as a compromise temperature.

Just in case it is considered to sell self-contained air conditioning units for cutting rooms it must be remembered that the tonnage ratings on these machines is usually based on a room temperature around 80 degrees. Their capacity may be reduced by as much as one half where attempt is made to pull down to 50 degrees. This fact must be kept in mind when computing tonnage capacity of units normally intended for higher room temperatures.

$90,000 Gross on $2,000 Investment In Two Years

By WILLIAM H. MORRISON

A COUPLE of thousand dollars isn't much when one is starting in the refrigeration business, especially in these days of high prices, yet C. Steinmann of Louisville Ky. took that amount and started the 20th Century Refrigeration and Air Conditioning Co. at 1121 West Market Street. Business began on September 4, 1945. The business that this firm did in 1946 amounted to exactly $90,636.72. It was all accomplished through that original investment, together with several business ideas which will be presently explained. Since that first year in business the volume of business done by this firm has shown a steady increase with 1948 giving every promise of exceeding the years before.

One thing that has increased the business this young firm has done is the side lines that have been added. After the firm had been in business only four months, Mr. Steinmann became aware of the fact that every customer for commercial refrigeration and air conditioning equipment is also a user of many other lines. It appeared to Mr. Steinmann that it would be good business to carry these other items that his refrigeration and air conditioning customers used. Mr. Steinmann argued that these other items would swell the total amount of business that could be done with each customer. In the second place, these other items would be required from time to time, making each customer a repeat customer. Furthemore, these other items would enable his firm to keep in touch with all of the firm's customers so that as new developments in refrigeration and air conditioning came along, the firm would have an inside lead in selling it.

Four months after the firm started in business, a rather long list of items used by its customers was added—among which were coffee urns, stools, counters, booths, steam tables, cutlery, chairs, tables, griddles, restaurant supplies, china, etc. In short, 20th Century began stocking everything that its customers required, so completely that the firm uses the catch phrase—"we furnish everything but the waitresses, food and liquor." The addition of these side lines has enabled the firm to do a steady business with its customers and at the same time chalk up a larger gross business than would be the case othewise. Today about fifty percent of the business done by this firm is in the side lines with the

Two of the service trucks used by 20th Century standing in front of the company's headquarters.

This interior view of the Rainbow Grill in Louisville, Kentucky, shows a sample of the work done by 20th Century Refrigeration Co., who supplied all furniture and fixtures in addition to the refrigeration needed.

other fifty percent in the refrigeration lines.

Some idea of how these side lines help swell the gross business done can best be discovered by citing a few actual sales. One $10,000 job done by this firm had refrigeration equipment amounting to $1,700—with the rest being the side lines. Another job amounting to $5,000 including $1,200 in refrigeration, while another job that ran to $6,000 had $1,100 in refrigeration equipment. If 20th Century had been exclusive refrigeration equipment it would have gotten only the smaller amount in each case.

Everything sold and every job must give satisfaction or it will be changed to give satisfaction. One little incident that recently happened will indicate how far this firm goes to give satisfaction. It recently sold a specially built bar for $2,818. During construction a slight mistake was made. Actually the bar was made four inches higher than it should have been. The slight extra height could have been taken off very easily but the purchaser expressed his idea that he wasn't satisfied with the bar and wouldn't be satisfied with it if it were altered. So Mr. Steinmann did what he always does—made good. He built an entirely new bar, installing it at no cost to the purchaser. The old bar had been cut down and installed so when the new one was ready, Mr. Steinmann and five of his men worked one Sunday from eight-thirty in the morning until after three in the afternoon, taking down the other one and erecting the new one. The deal meant a loss for 20th Century but Mr. Steinman feels it was the only thing to do. The bar was in a clubhouse with 400 members. Already a $10,000 job has come to his firm because of the square deal he gave the club and a number of smaller jobs have also come through. In time, 20th Century will get many times the value in more business.

Mr. Steinman believes in being first with the newest and he thoroughly examines every trade publication in his line, taking time to go through it as soon as it reaches his desk. Every new item advertised is checked with a red pencil and an employee in the office gets a letter out the same day to each manufacturer, asking details of the item advertised. Since he has been in business, Mr. Steinmann has purchased small quantities of several things that have turned out to be 100% no good but at the same time he has taken on some

other items that have more than paid for his losses in worthless items. He believes it is worthwhile to try out every new item in his field as soon as it makes its appearance because on the average enough excellent items will be found to put real zip into the business.

In every business there are some items on which a greater profit is made than on others. This does not appeal to Mr. Steinmann as good business philosophy. Instead of making as much as he can on everything he sells, he has a fixed mark-up on everything he handles. By following this system, everything is priced properly—nothing higher than the other fellow charges and some items lower.

Advertising

Mr. Steinmann is a firm believer in advertising and does plenty of it. He advertises every day in both Louisville daily newspapers. He uses the yellow pages of the Louisville telephone book, having the largest advertisement that the telephone company will sell. In the baseball season he has an advertisement in the baseball program, occupying the space below the score box space. He has a large mailing list which includes customers and potential customers in his territory. This is regularly circulated with sales literature put out by the various manufacturers whose product he handles. His firm also issues a catalog.

Recently Mr. Steinmann has begun using a new advertising idea. He has the large size book matches known as Billboard book matches made with an advertisement of the business of a customer on the outside and with the simple wording, "Installed by 20th Century Refrigeration and Air Conditioning Co., Louisville, Ky." on the inside. He supplies each customer of 20th Century with a six months' supply of these Billboard book matches which the customer gives out to his customers to advertise his business. At the same time, 20th Century gets some advertising, too. It must be remembered that all kinds of people patronize cafes, restaurants and bars. Many of such customers are also prospects for commercial refrigeration. Mr. Steinmann figures that it is well worth the cost of the match books to get his firm's name before so many people.

Service with this firm is on a 24 hour basis and when 24 hours is mentioned that is exactly what is meant. Service is available every hour around the clock. From eight in the morning until five in the evening, with the exception of Sundays, a service call to the place of business will start a serviceman toward the job at once. From five in the afternoon and on Sundays, a service call to another number will do the same thing. In all of the advertising of 20th Century, both telephone numbers are listed. The daytime number is indicated as the daytime number and the other as the night number. From five in the afternoon until eight the next morning, contact is maintained by means of a phone exchange operated like physicians use, which keeps in constant touch with some serviceman of 20th Century. At present this firm is operating three service trucks and has four servicemen, all of whom are ex-G.I.'s. More service trucks and servicemen will be added this summer when business reaches a peak.

Service As Sales Builder

It is one thing to claim to offer service and quite another to really furnish it. The proof is in a typical example of how service is rendered by this firm. Not long ago a service call came through at nine o'clock one Sunday evening. The call came from a place in the country some sixty miles from Louisville. Exactly one hour and a half later, or at ten-thirty, a serviceman was actually at the spot rendering the service needed. It is that sort of service that gets business from competitors for this firm. One more example might be worth mentioning. A Louisville butcher who had his refrigeration equipment installed by a competitor suddenly had his equipment go bad. The butcher had just put in a large shipment of fresh meat which would have gone bad if the equipment could not have been serviced promptly. A call by the butcher to the firm that installed the equipment brought the response that a serviceman could not be sent until the next day. The butcher called 20th Century and a serviceman was dispatched within five minutes, thereby saving the meat. Needless to say the butcher now buys what he needs from 20th Century. This firm is a bit different from many in the refrigeration field. It welcomes service calls from firms that did not buy their equipment

from 20th Century, and it also welcomes service calls where several other refrigeration firms have failed. Such calls enable 20th Century to really show what it can do and that, Mr. Steinmann has found, gets business in a big way.

All equipment is guaranteed for a period of one year, with service being rendered during that time without cost. After that a charge is made. This firm does no servicing on a contract basis, it being Mr. Steinmann's belief that servicing on a contract basis tends to produce poor service which is something that he doesn't wish to do. After the year's guarantee is up, all service is on a job basis, being charged for at the rate of $3.50 per hour, with a minimum charge of $3.50. All materials and parts are, as usual, extra.

The firm maintains its own shop where repairs are made and also where special equipment is turned out. The shop is equipped to do welding, work in sheet metal and in wood. It is equipped with all sorts of machines including lathes, drill presses and grinders.

20th Century covers the entire state of Kentucky and the southern portion of Indiana. It has a sales manager with six salesmen under him who continually keep in touch with the territory.

The firm is state distributor in Kentucky for Super-Cold Products, Selb Display Cases and Colbar Beverage Coolers. It also handles the Star Equipment for restaurants, National Beverage Coolers and Drain Hoods, Cleveland Refrigerators and walk-in coolers; and handles front and back bars made by two different firms. Besides this, it is service agency for Kelvinator.

TOO MANY DEALERS WILL MEAN PRICE CUTTING

AS A RESULT of the return to normal selling after seven and one-half years of postponements and easy order taking, "it behooves us to take inventory of our sales facility status," Harry M. Kelley, manager, appliance sales, Frigidaire Division, General Motors Corporation, told the Fourth Leadership Conference of the National Electrical Retailers' Association recently.

Kelley pointed out that "with the exception of some brands of refrigerators, most major appliances in most parts of the country are already in a market situation where they must be sold."

"Dealers have a greatly improved and expanded sales facility in their newly built, newly decorated and newly arranged display floors, but when we attempt to evaluate both the quantity and quality of our retail manpower ingredient, we must admit that we are far short of the mark for aggressive selling."

"Also," Kelley continued, "the tremendous increase in the number of major appliance outlets may have very serious effects upon our industry. Prewar, it is estimated there were about 25,000 major appliance dealers in the United States. Now, best estimates indicate between 70,000 and 80,000. We believe that a very high mortality of dealers is bound to come in the not-too-distant future."

Kelley explained that dealer mortality may be traced to lack of capital, inability to secure franchise of accepted brand name products, poor store locations, inexperience, manufacturer's failures to properly guide the dealer, poor service, inability to handle trade-ins, and lack of aggressiveness and initiative in a normal buyer's market.

He warned that merchandise dumping including price cutting and chiseling, may be expected when dealer mortality reaches its peak. "When this starts, it will call for careful sales management on the part of the ambitious, aggressive retailer who receives any sizable portion of his total volume from major appliances and two expects to succeed and maintain a permanent business. If he tries to meet price cutting with price cutting, it will only help develop a situation that may spell his downfall."

Kelley concluded that the only thing a dealer who wants to survive can do is sell. He suggested that dealers increase sales organizations to normal market operating strength, get the best lines of appliances available, immediately establish an aggressive sales program.

Moisture Migration Problems Discussed by Cook and Starr

AIR that is cold, moist and virtually non-circulating is most efficient in preserving food in household refrigerators, according to a paper presented by S. V. Cook and F. F. Starr, both of Frigidaire's engineering department to members of the American Society of Refrigerating Engineers during the 35th annual spring meeting at Swampscott, Mass., recently.

"Low temperatures alone, will not result in the best food preservation," the paper disclosed. "Instead, this basic factor must be coupled with two others —a high percentage of humidity and a low velocity air circulation." This common, but often overlooked, phase of refrigeration was strongly re-emphasized by both Cook and Starr, co-authors of the paper, "Moisture Migration Problems In Refrigerators and Freezers."

Cook and Starr pointed out that, while the low temperature factor reduces bacterial and mold attacks on food, it is the high percentage of humidity in the air and low velocity circulation that retards dehydration, discoloration and in the case of fresh vegetables and fruits, staves off wilting.

They said that with negligible air movement and high humidity in the household refrigerator: (1) weight losses in food are less; (2) there is less deterioration of the food; (3) the original flavor of the food is retained to a greater extent, and (4) more nutritional value is retained. Another advantage is that the transfer of odors from one food to another is greatly reduced.

The paper went on to say that, generally speaking, the increase of relative humidity without decrease of air movement only partially results in good food preservation. The decrease in the air movement with considerable increase in humidity only partly solves the problems of dehydration. But with a high relative humidity and negligible air movement, migration of moisture from foods can be effectively reduced, and the time element of food preservation substantially lengthened.

In the preservation of foods for short periods, moderately low temperatures and relatively high humidities are adequate. Preservation for long periods demands lower temperature and retention of as much of the food's natural moisture as possible. In the household refrigerator, foods can be caused to maintain their natural moisture and freshness in different ways—either by being stored in closed containers, or in open containers if the desired relative humidities is maintained.

Rapid strides have been made by the refrigeration industry in developing household refrigerators that will maintain temperatures of approximately 40 degrees Fahrenheit in the food compartment and a relative humidity of 80 per cent or higher. In early models, as in some present-day low humidity refrigerators, the relative humidity was only 55 per cent and temperatures about 50 degrees (F.) With air circulating at the rate of 10 to 30 feet per minute, food necessarily had to be kept in covered dishes. However, some models today, such as those equipped with sealed refrigerant tubes in the walls, bottom and top of the food compartment, maintain temperatures of about 40 degrees (F.) and have a relative humidity reading of 80 per cent. Air circulates at a rate much less than 10 feet per minute.

Where evaporators operate at 20 degrees (F.) meats and vegetables can be stored for a period of about two weeks. Ordinary waxed paper is a satisfactory wrapper, for short storage. Where evaporators operate at plus 10 degrees (F.), the period of storage can be increased to about three months. The wrapper used here should be of a low rate of moisture vapor transmission.

The importance of the design of vegetable drawers or hydrators was stressed. "There are problems of moisture migration here as elsewhere in the refrigerator," Cook and Starr wrote. "The relative humidity is governed largely by the migration of moisture from vegetables in storage, and also by the humidity of air surrounding the vented drawer. If there is an excess of venting, humidity will be lowered to the extent that some foods will dehydrate. On the other hand, lack of venting causes food to mold and deteriorate because of too much humidity. The amount of venting designed into a dehydrator drawer must be governed by the relative humidity and air movement in the food compartment."

The information contained in this article was taken, with permission, from the Tecumseh Products Company Service Manual. The manual was originally intended as service and installation instructions for the manufacturer who may be assembling Tecumseh units in the finished product such as a home freezer, water cooler, domestic refrigerator, etc. However, there is much information of value to the serviceman in these instructions and for that reason it is being reproduced in part here.

Installation and Service On
The Tecumseh Hermetic Unit

THE Tecumseh Hermetic represents the accumulated experience of many years of production of high side equipment for refrigeration. The units are produced in a modern plant, equipped with the finest precision machine tools, many of them automatic or semi-automatic, in high speed, line production.

But any piece of mechanism is subject to failure, from original concealed defects in material or workmanship or from the natural wear incident to prolonged operation. In such cases, the primary object of the serviceman should be to put the unit, or a replacement, in operation as soon as possible to give the customer uninterrupted, trouble free and efficient service. It is with this in mind that this service article is written.

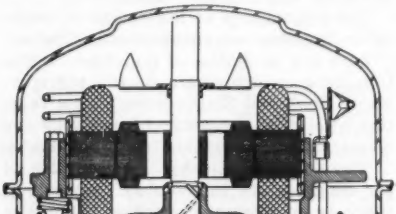


Fig. 1—Cross Section of Unit

After careful consideration, the idea of a hermetic unit that could be dismantled in the field has been abandoned. The earliest Tecumseh hermetics were made with a cast iron housing, bolted together with this idea in mind. However, it has been demonstrated that the average service shop does not have adequate equipment or trained personnel for this purpose. In the high speed hermetic unit, the tolerances on the individual parts are very small, usually one or two ten thousandths of an inch. Parts must be selectively fitted within the same limits. Gauges for these measurements are not found in the best equipped service shops. Other parts require equally careful handling.

Then also, the addition of gasketed surfaces, increases the possibility of leakage or seepage of gas. This is more important with the capillary system because the charge is usually very small, a few ounces of Freon and a small leak would make the system inoperative.

Finally, probably the most important point is that extreme dryness is required for successful hermetic operation. The ordinary drying equipment is not adequate.

The Tecumseh hermetic compressor is completely sealed and tamper proof. The serviceman will find the hermetic

service work largely a replacement business. Relatively few parts need exchanging; the complete unit assembly, the relay, the overload and the fan motor assembly.

Tecumseh hermetic service operations are very simple. Read carefully the sections on construction and those relating to field replacement operations. The proper diagnosis of the cause of failure is most important.

Gas Circuit

The Tecumseh hermetic is designed exclusively for the use of Freon-12 and Freon-22 refrigerants. By referring to Fig. 2 and Fig. 3 the gas circuit can be traced as follows:

a. Suction gas from evaporator enters compressor suction service valve at (a).

b. Suction gas fills upper dome (b) and crankcase (c).

c. Suction gas enters suction inlet tube at (d) and passes through suction valve (e).

d. After being compressed in the cylinder (f) the gas passes through discharge valve (g).

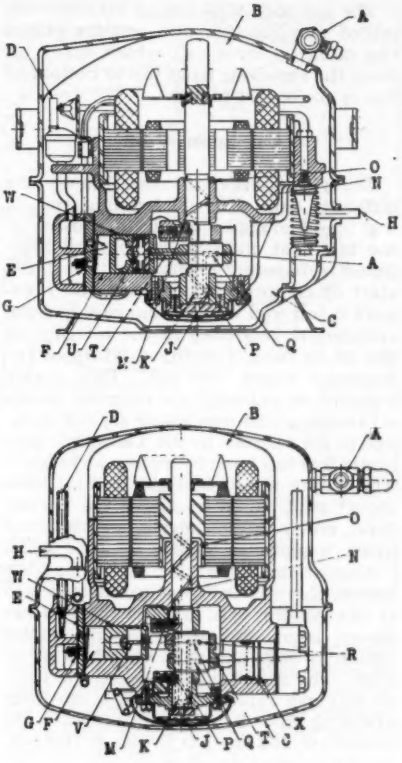
e. Discharge gas passes from discharge valve (g) to muffler and finally out of crankcase (c) to condenser through tube (h).

Lubrication

The lubrication of the Tecumseh hermetic unit is completely accomplished by centrifugal force. All reciprocating parts and bearings are constantly lubricated by oil under pressure. This process is covered completely by patents and patents applied for.

The lower half of the compressor motor shell constitutes a large oil reservoir. The oil level in the lower shell is maintained at about the connecting rod center line. Consequently all exposed parts are constantly lubricated by splash.

The upper main bearing is lubricated by a constant flow of oil. Through an opening in the thrust plate (j), oil is pumped centrifugally through inclined hole (k) to outlet hole (m) which communicates with helical groove (n) in the crankshaft upper bearing. Due to the force generated in the inclined hole, the oil flows through the helical groove, overflowing at outlet (o) and returning



Figs. 2 and 3

to the crankcase. The lower bearing is lubricated by means of an off center supply hole communicating with a helical groove in exactly the same manner.

The reciprocating parts are likewise oiled by forced feed lubrication. Oil enters through the thrust plate opening (j) into vertical oil hole (p) and centrifugal force is generated in the horizontal oil passage in the crank throw (q). This ends in a port in the eccentric (r). The connecting rod is milled out and also drilled throughout its length (t). On each stroke, the port (r) connects with milled slot and forces a small amount of oil through (t) up to the wrist pin. The pin is hollow and has a drilled hole (u) opening to the inside of the pin and groove (v) on its outer circumference. Thus oil is forced not only to the small end of the connecting rod but also the cylinder walls and piston.

The cylinder wall has an oil reservoir milled into the side (w) and the piston has oiling grooves (x) which carry oil from the reservoir from top to bottom of the cylinder and piston.

Oil Separation

Every refrigeration man knows the difficulty caused by oil foaming, resulting in oil slugging. This is caused by the fact that oil holds in solution some liquid refrigerant, consequently at the start of compressor operation the prespure is lowered in the crankcase and the refrigerant vaporizes in the oil causing the oil to form a frothy mixture of refrigerant vapor and oil. This foamy mixture on entering the cylinder causes oil slugging and may cause serious damage to the valves. In the Tecumseh hermetic this has been overcome as follows: The frothy mixture of gas and oil loses its oil as it raises up above the normal level, much on the order of a carbonated drink foaming in a glass.

Should the foam rise as high as the motor, there is only one point at which it can get through. This is the gap between rotor and stator of the motor which is only a few thousandths of an inch. The scrubbing action on the foam in this gap rapidly breaks up the foam allowing the oil to drop back into the crankcase and the gas to rise to the suction inlet (d).

Starting Under Load

As may be seen by referring to Figs. 2 and 3, the Tecumseh hermetic is free from mechanical and electrical unloading devices sometimes employed to facilitate starting of compressor. This has been accomplished by the use of a split phase type motor.

Previous to 1940, Tecumseh made parallel lines of hermetics, capacitor start types for use with expansion or float valves and split phase for use with capillaries.

Practically all of the most modern hermetic applications now employ the capillary tube or restrictor tube in place of the expansion valve or float valve. Such systems are self-unloading. That is the liquid refrigerant all flows into the low side during the "off cycle" and the condenser pressure drops to substantially the same as the low side pressure. The motor load at the start is very low. The characteristics of the split phase motor are such that its starting torque is relatively low, about 175% of the full load, however, its efficiency at full load is at least the equal, if not the superior of the capacitor or repulsion

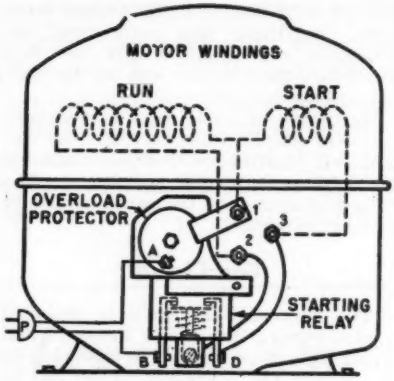


FIG. 4.

FIG. 5.

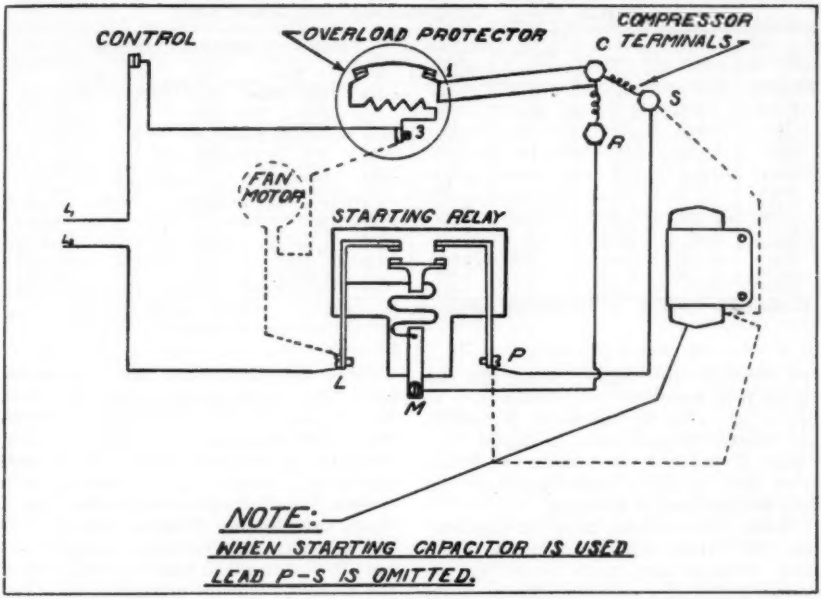


FIG. 6.

induction motor, commonly used on open type units.

The fundamental theory back of the split phase motors is that a starting torque is induced by starting winding and main winding in the motor being more-or-less out of phase with each other electrically and as soon as the speed of the motor is brought up to a certain point, the starting winding is cut out and the full load is carried by the running winding of the motor.

Spencer Relay

All Tecumseh hermetic compressors are equipped with a starting relay manufactured by the Spencer Thermostat Company.

The relay consists of a magnetic coil which actuates a movable contact and completes circuit through the starting winding of motor, Fig. 5. When the motor reaches a pre-determined speed, the magnetic coil releases the movable contact and disconnects the starting winding from the circuit. The motor running winding, however, remains in the circuit at all times. Complete wiring diagram is shown in Fig. 6.

The relay is mounted in shell bracket, see Fig. 4, and no adjustments can be made in field. In case of relay trouble, the complete assembly can be changed by simply removing mounting screws and disconnecting leads.

Spencer Overload Protector

All models of Tecumseh hermetic compressors use a new motor protector manufactured by the Spencer Thermostat Company. This device, together with the starting relay, is mounted on a bracket welded to the compressor shell and protected by a stamped steel housing. See Fig. 5.

The motor protector consists of a small, round, plastic casing containing a heater coil (A), and a bi-metal disc (B). The heater coil is designed to carry normal starting and operating currents. However, should the current increase an abnormal amount for any reason, the excessive heat from coil causes the bi-metal disc to snap open, thus breaking the electrical circuit and stopping motor. In case the motor winding temperature increases for any other than electrical reasons, the disc is also affected by shell

TABLE 1 — COMPRESSOR SPECIFICATIONS

Model	Bore	Stroke	No. of Cyls.	Displacement C.F.M.	Motor		Suction Service Valve	Discharge Flare (Female)	Mounting
					H.P	Type			
S44	1 1/4"	5/8"	1	.767	1/4	Split Phase	3/8"	1/4"	Internal
S54	1 1/4"	5/8"	1	.767	1/5	Split Phase	3/8"	1/4"	Internal
S64	1 1/4"	5/8"	1	.767	1/6	Split Phase	3/8"	1/4"	Internal
S68	1 1/8"	5/8"	1	.620	1/6	Split Phase	3/8"	1/4"	Internal
S84	1 1/4"	5/8"	1	.767	1/8	Split Phase	3/8"	1/4"	Internal
S88	1 1/8"	5/8"	1	.620	1/8	Split Phase	3/8"	1/4"	Internal
S3414	1 1/4"	7/8"	1	1.074	1/3	Capacitor	3/8"	1/4"	Internal
S3814	1 1/8"	7/8"	1	.868	1/3	Capacitor	3/8"	1/4"	Internal
S4414	1 1/4"	7/8"	1	1.074	1/4	Split Phase	3/8"	1/4"	Internal
S4814	1 1/8"	7/8"	1	.868	1/4	Split Phase	3/8"	1/4"	Internal
B2413	1 1/4"	13/16"	2	1.994	1/2	Capacitor	1/2"	1/2"	External
B2813	1 1/8"	13/16"	2	1.612	1/2	Capacitor	1/2"	1/2"	External
B3411	1 1/4"	11/16"	2	1.687	1/3	Capacitor	3/8"	3/8"	External
B3811	1 1/8"	11/16"	2	1.364	1/3	Capacitor	3/8"	3/8"	External
B4811	1 1/8"	11/16"	2	1.364	1/4	Split Phase	3/8"	3/8"	External

REFRIGERANT CHARGE
6 oz. Freon 12 or 22

Oil charge--Single Cylinder--40 oz.
Twin Cylinder---55 oz

For use with restrictor tube or other self-unloading systems only

temperature thus again protecting the motor from excessive temperatures. The motor protector is, therefore, in reality, an electro-temperature protector because it protects the motor windings from getting above predetermined and safe tempertures in all cases.

When the overload trips for any reason the circuit remains open until the shell temperature cools down to the proper point, at which time the bi-metal disc snaps closed; thus, again starting the motor. This process is repeated as long as there is an abnormal load condition on the compressor for any reason.

The motor protector is not adjustable and if it fails to function properly, it must be replaced with a factory adjusted assembly.

When a unit is started originally with warm cabinet, the protector may open and close a few times until cabinet begins to cool down. This is a normal condition at time of start up and should not be interpreted as motor protector trouble.

The Capillary Tube

The use of the capillary tube in refrigeration is not new. As a matter of fact some of the earliest of the refrigeration units used a restrictor similar in action to the capillary. This took the form of a small orifice or nozzle or short tube.

The function of the capillary is to act as a vapor lock and not a liquid control. The volume of vapor per pound of refrigerant is many times the volume of the liquid. As an example we may take the volume of saturated Freon-12 vapor at 86 degrees compared to the volume of liquid at the same temperature. The vapor occupies .389 cubic feet per pound, thereas the liquid is .0124 cubic feet per pound; the volume of gas is thirty-one times as great as the liquid. Therefore, under a given pressure difference, the capillary will pass many times the weight of liquid that it will of the gas. The capillary length and bore are adjusted so that it will just pass the required amount of liquid under the normal differences of pressure in the system. Should the pressure increase, the liquid passes through the capillary faster than it condenses.

However, as soon as the gas starts to flow the tube acts as a restrictor, reducing the weight of refrigerant passed in a given time and allowing liquid to again build up at the capillary entrance. On the other hand, if the pressure difference is lowered due to lower room temperature perhaps, the liquid will condense faster than the capillary will carry it away and it backs up slightly into the condenser.

Also at the exit end of the capillary there are gas bubbles formed. This is obvious from the pressure and temperature gradients. At the entrance end, the liquid is at saturated temperature and pressure corresponding to the condenser conditions. Likewise in the evaporator we find a lower saturated temperature and pressure. At some point in between, toward the exit end of the capillary, evaporation must start to lower the main body of liquid to the evaporator temperature. Further, lowering of the evaporator pressure reduces flow and increase of pressure, increases flow.

Thus, the capillary is self compensat-

ing over a considerable range of temperature and pressure on high and low side, much like an expansion valve.

The Length of Capillary

The length of capillary must be determined for each piece of equipment or for each condition of suction and average head pressure. In Table 2, several approximate lengths and bores of capillary tubes are given for various unit sizes and suction temperatures. However, contrary to the usual impression, these lengths are not critical. If, for example, we were to plot the calorimeter capacity curve of a hermetic unit using a fixed back pressure obtained with an automatic expansion valve and then superimpose on this curve, the calorimeter curves obtained with various lengths of capillary tube, we would find, of course, that there is a definite suction temperature at which the capillary curve is tangent to the expansion valve curve. On either side of this point, the capillary curve will show less capacity. However, the amount of deviation over a considerable range is very small, usually about 2.5% over a ten or twenty degree range. Actually the length of capillary is not critical. We have seen many instances in which the capillary length has been changed two or more feet without noticeable increase or decrease in running time of the system.

Usually the range of operation in actual systems is very small. In an ice cream cabinet, for example, the "cut-in" may be seven or eight pounds and the "cut-out" three or four pounds with Freon-12. The extreme difference of five pounds would not affect the performance of the capillary appreciably. On the other hand, we may have a beverage cooler cutting in at, say 25 pounds and out at 18 pounds. The difference in length of capillary for these two systems, when applied to the same hermetic unit, would be very great. The ice cream cabinet would require about double the length of capillary of the same bore that the beverage cooler would use.

The final answer to the length of capillary must be determined for each installation.

Elimination of Dirt and Moisture

It is fundamental, in processing of any equipment, in which a hermetic unit is applied, to use constant care to eliminate dirt and moisture. While it is not possible to lay down fixed rules that will cover all the processing procedures on all of the various equipment to which these hermetics are applied, there are certain essentials that can be followed and kept in mind while setting up processes in any plant.

First, and probably most important, is the general principle that it is much easier to prevent entrance of moisture and dirt in the first place than to remove it later. This requires constant attention to small details.

Copper tubing should be purchased dry and sealed. It should be protected against entrance of dirt and moisture during each step of the process. When it is necessary to cut a tube, it should be closed immediately by flattening the cut end or by flaring and closing with a sealing plug. Also, it is important to see that no cuttings or filings enter the tube during the cutting operation and that they are promptly removed, if they should get in.

TABLE 2 — CAPILLARY TUBE DATA

Model No	−10°	+15°	+35°
S88L	.....	17 ft. .040" ID	.....
S88LE	17 ft. .036" ID	17 ft. .040" ID	.....
S84LD	17 ft. .036" ID	.....	.....
S84LE	17 ft. .036" ID	.....	.....
S84LD	17 ft. .036" ID	.....	.....
S68HF	.....	.....	8 ft. .040" ID
S64LE	17 ft. .036" ID	.....	.....
S64LD	17 ft. .036" ID	.....	.....
S54H	.....	.....	10 ft. .050" ID
B4811L	12 ft. .040" ID	.....	.....
B3411L	14 ft .050" ID	.....	.....
B3811H	.....	.....	10 ft. .062" ID
844L (F22)	14 ft. .040" ID	.....	.....

In soft soldering or silver soldering operations, use extreme care not to get flux into the inside of the tubing and to clean thoroughly if the tube is accidentally contaminated. Flux is difficult to clean out.

Capillary tubes should have the open ends protected at all times until they are actually installed in the system. Bank pins of the proper diameter are useful for this purpose. Even a speck of dirt may cause a plugged capillary.

This section is not intended as an exhaustive treatment of the elimination of dirt and moisture, but it does indicate the general nature of the precautions that should be observed.

It is always easier to eliminate dirt and moisture by not allowing them to enter the system, than by removing afterwards. General shop cleanliness is the best preventative.

Dehydration—Heat Vacuum Method

Moisture has always been one of the major problems in the refrigeration industry. This is true regardless of the type unit or system being assembled because it always causes the same trouble; namely, frozen capillary or expansion equipment.

If the system is properly dehydrated, cleaned and sealed at the time of assembly, there is very little chance of moisture ever getting into the system.

The most commonly used method of dehydration is the heat vacuum method, which is used in the Tecumseh Products Company plant. With this procedure the equipment being dehydrated is placed in an oven and heated at a certain temperature for a specified period of time under a deep vacuum. In this way the moisture in a unit is evaporated and removed by the vacuum pump.

The equipment required is as follows:

A. OVEN—Any type well-constructed and insulated oven that can maintain a constant temperature throughout of 275 to 300 F., with maximum temperature differential of 10 F., can be used. Any available source of heat is also satisfactory. The size of the oven will, of course, depend upon the size and number of units, low sides, etc., to be dehydrated at one time.

B. VACUUM PUMP—The vacuum pump is perhaps the most important item of shop equipment because, to properly dehydrate, it is necessary to obtain almost a perfect vacuum within the equipment being processed.

One of the best vacuum pumps obtainable is the Kinney Pump, manufactured by the Kinney Manufacturing Co., Boston, Mass. With this type pump it is possible to obtain vacua well below 50 microns required by Tecumseh's process specifications. Literature giving complete information on this type pump can be obtained from the manufacturer.

C. McLEOD VACUUM GAUGE—As you will note in the process specifications covering dehydration, a vacuum of 50 microns or less is required in the pump manifold. Inasmuch as one micron is equivalent to one twenty-five thousandth of an inch of mercury, it can be readily understood that a very special and accurate gauge is required to register vacua of 50 or less microns.

CAPACITY DATA

Model No.	-20	-10	0	10	20	30	40
S88LD	280	400	550	720	920		
S88LE	280	400	550	730	980		
S88L	340	500	660	840	1040		
S68HF					1030	1280	1530
S68HD					960	1180	1420
S68HJ					1030	1280	1530
S64LD	350	510	680	880	1070		
S64LE	340	490	660	850	1060		
S64L	425	630	830	1050	1330		
S64LF	425	630	830	1050	1330		
S54H					1440	1760	2110
S54HF					1440	1760	2110
S54L	450	680	880	1140	1440		
B4811L	825	1230	1630	2030	2400		
B3411L	1200	1600	2020	2450	2890		
B3811H					2580	3100	3800

The McLeod gauge is one of the very fine gauges satisfactory for this application. They may be obtained from the General Electric Co., Schenectady, New York, or Stokes Manufacturing Co., Philadelphia, Pa.

D. MANIFOLD SYSTEM—The manifold is usually made of copper pipe of the diameter of the pump inlet or at least 2" in diameter and preferable 3", connected to the vacuum pump through a good quality shut-off valve. The manifold has ⅜" male flare openings at convenient locations to accommodate the apparatus to be dehydrated.

To speed loading and unloading of ovens, these manifolds may be built onto trucks and the unit hook-ups made outside the oven, then wheeled into the

oven and connected through a union to the vacuum line.

Valves, hookup tubes, unions, etc., must be kept large enough to offer little or no restriction to the vacuum system.

E. GENERAL PROCEDURE FOR LOW SIDES—Connect the apparatus to the manifold and carefully check each connection for leaks, using refrigerant gas and leak detector. To give higher test procedure, oil pumped nitrogen may be introduced into the system as a booster.

Purge to zero pounds gauge and start vacuum pump.

Start oven heat.

The time required for dehydration will be determined by the type of apparatus dehydrated and the size of the vacuum pump.

In some cases it may be found necessary to sweep the load with oil pumped nitrogen. This is done by shutting off vacuum pump half way through dehydration and introducing oil pumped nitrogen into the system to a pressure of approximately 20 lbs. gauge and then evacuating as before. This sweep has been found necessary to successfully dehydrate systems containing silica-gel, cotton, paper or other organic materials.

In order to maintain the efficiency of the deep vacuum pump, it has been found advantageous to use a second pump to pull the load down to around 500 microns, then switch to the finish pump to attain limit vacuum readings.

At the end of the dehydration cycle, close valve to vacuum pump and introduce refrigerant gas pressure to 25 lbs. gauge as a holding charge. Close unit valves and remove from oven.

LIMITS: Temperature 275 to 300 degrees F. Vacuum 50 microns at vacuum pump. 200 microns at end of manifold farthest from pump. Time—to be determined by test.

Dry Air Dehydration

This system is recommended for evaporators and lowsides only, where it is not practical to use heat-vacuum method, such as bulky coil assemblies or where the coil is a part of the equipment liner. It cannot be used for hermetic compressors.

The dry air dehydration system is a process of dehydration using dry air of -60 F. dewpoint or lower. The dry air is passed through the apparatus to be dried until the outlet air has the same dewpoint as the inlet air. This process makes it possible to dehydrate large, bulky evaporators after they have been installed in the cabinet complete with connecting tubes, expansion valves, capillary tubes, dryers, etc. When using this system it is essential that apparatus to be dried is clean and free of any oil, dirt, scale, oxide, rust, soldering flux, or any other foreign matter.

The following equipment is recommended in setting up the dry air system:

A. A compressed air system of ample size—approximately 100 pounds pressure.

B. A Pittsburgh Lectrodryer. Details on the equipment may be obtained from the Lectrodryer Corp., Pittsburgh, Pa.

C. A distribution manifold with restricted process tubes.

D. A dewpoint indicator (Pittsburgh Lectrodryer) — (General Electric Company).

E. Space heaters or oven.

F. Drying procedure.

The air from the source should be cleaned by passing through filters and separators to remove any oil, dirt or water present. The inlet to the Lectrodryer is connected with this source and the outlet to a constant pressure valve on the distribution manifold with shut-off outlets at desired locations. If desired, supplementary equipment may be placed in the system ahead of the Lectrodryer to reduce the moisture content of the inlet air and thereby lengthen the usable time of the dryer without regeneration.

A restrictor process tube should be made for each outlet so that approximately fifteen cubic feet per hour is passed through each station when operating at a predetermined manifold pressure.

The time of the drying cycle can be shortened by heating the apparatus to be dried by space heaters or infra red lamps in cabinets, or by oven heating. The maximum temperature will be governed by the safe temperature to which the apparatus can be subjected.

Actual test will have to be made to determine how often the manifold air must be checked and also the time necessary for dehydration. When the

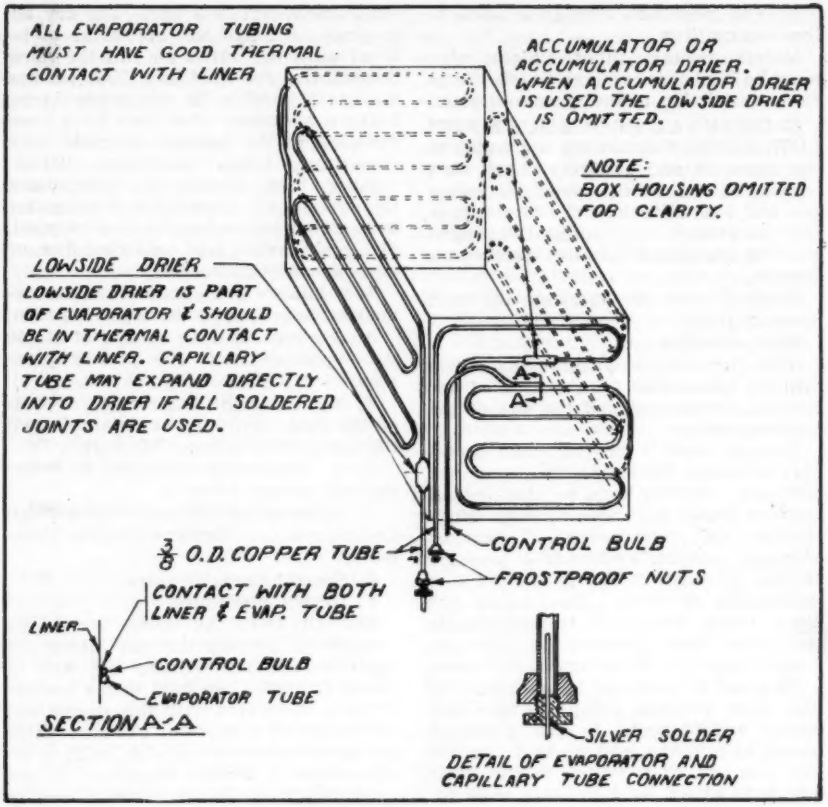

ALL EVAPORATOR TUBING MUST HAVE GOOD THERMAL CONTACT WITH LINER
ACCUMULATOR OR ACCUMULATOR DRIER. WHEN ACCUMULATOR DRIER IS USED THE LOWSIDE DRIER IS OMITTED.
NOTE: BOX HOUSING OMITTED FOR CLARITY.
LOWSIDE DRIER
LOWSIDE DRIER IS PART OF EVAPORATOR & SHOULD BE IN THERMAL CONTACT WITH LINER. CAPILLARY TUBE MAY EXPAND DIRECTLY INTO DRIER IF ALL SOLDERED JOINTS ARE USED.
A
A
3/8 O.D. COPPER TUBE
CONTROL BULB
FROSTPROOF NUTS
CONTACT WITH BOTH LINER & EVAP. TUBE
LINER
CONTROL BULB
EVAPORATOR TUBE
SECTION A-A
SILVER SOLDER
DETAIL OF EVAPORATOR AND CAPILLARY TUBE CONNECTION

FIG. 7.

dewpoint check indicates that the apparatus is completely dehydrated, it should be thoroughly purged with dry refrigerant gas and connected to the condensing unit or plugged and capped for future use. This dehydration process has proven to be very consistent and efficient but, when used on production, it is always necessary that a certain percentage of completed systems be tested for moisture content.

Low Side Drier

A diagrammatic sketch of low side showing suggested method of refrigerant flow, type and location of drier, heat exchanger, etc., is shown in Fig. 7. Details, of course, have to be worked out for each individual system.

It is definitely recommended that the silica gel drier, in any type system, be located in the low side (see Fig. 7), because driers at evaporator temperature will absorb a great many times more moisture than when located in high side of system. Practically all of Tecumseh's manufacturing customers are now using the low side drier and field experience has proven definitely that it eliminates moisture problems when the complete equipment is properly processed originally.

The low side drier can be installed either at the entrance of the evaporator (refrigerant expands directly from the capillary into drier) or at the evaporator exit. When installed in evaporator exit, it is incorporated in the accumulator. Many manufacturers are using the ac-

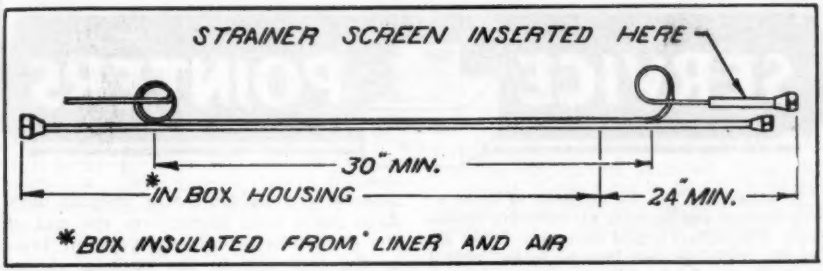


FIG. 8.

cumulator-drier because the cost is usually lower than individual costs of the drier and accumulator.

It is not safe to assume that new low side driers are dry, as received from the manufacturers. They should be activated, before putting in the system, by heating to 350 degrees and passing dry air through them at the rate of about one tenth cubic foot per minute or more for about one hour. After activation they should be sealed under Freon pressure.

Used Driers

Driers that have been in the system and are saturated with oil and Freon, cannot be reactivated by the above method. They may be reactivated by a replacement method. A second fresh drier is placed in the suction line and refrigerated to low pressure. The permanent drier may be heated slightly. In this manner, moisture is transferred from the permanent to the temporary drier, which is removed after an hour or two operation. It is important that the temporary drier remain at a lower temperature than the permanent drier during the process.

Heat Exchanger

In order to obtain a good heat exchanger the capillary tube should be soldered to the suction line for a minimum of 30". One third of the remainder of the capillary tube should be wound free in the unit compartment and two thirds coiled in a box housing or in accessible sealed compartment in cabinet insulation. See Fig. 8.

Strainer Screen

To prevent stoppage of the capillary tube by any minute particles of foreign matter, a 200 mesh monel screen is used at the entrance to the capillary. The screen is pressed lightly into short piece of ⅜ tubing and the other end of tubing is swedged or pressed over a mandrel down to correct size for capillary tube, allowing .005 clearance. See Fig. 8.

(To be continued)

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CALCULATING SURFACE OF FIN COILS

TO FIGURE the surface of a fin coil, both sides of the fin are to be considered as secondary surfaces, and the surface of the tubes as primary surface.

Thus a fin 3 inches by 3 inches is 9 square inches, from which deduct the area of ⅝ inch O.D. tube (which is 0.3068 square inches), leaving 8.6932 square inches per side of fin.

With ½ inch fin spacing, you have two fins per inch. Therefore, the secondary surface per inch of finned length = 8.6932 × 2 sides × 2 fins = 34.7728 square inches. The primary surface consists of one inch of tube length × its circumference, which is 1.963, equalling 1.963 square inches per one lineal inch. The total surface is the secondary plus the primary surface: or 34.7728 + 1.963 = 36.7358 square inches or 0.255 square feet surface per inch of finned coil tube length, or 0.255 × 12 inches = 3.06 square foot surface per 12 inches of tube length.

A coil with 12 tubes, ½-inch fin spacing, 60 inches finned length = 184 square feet of surface.

SERVICE POINTERS

A department for the exchange of ideas on new devices and methods of improving service work. Five dollars is paid for each pointer published. Write up your idea today and mail it to the Service Pointer Editor.

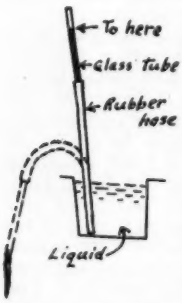
TRACE DID THE TRICK

METHYL chloride refrigerant had been added to ice maker system many times, without finding the leak. The only place left was the big black brine tank, which I could not accuse or convict for harboring the leak. Without recourse, my face was getting red by the minute. Red is the answer—the color of Trace! Following the directions on the label, Trace was put in the system, and in due time red spots started to appear in the brine. With recourse, and a pail, the brine was soon bailed out and the refrigerant leak repaired.—*Submitted by John J. Mulqueen, Brooklyn, N. Y.*

★ ★ ★

HOW TO MAKE A SANITARY SIPHON

EVER get any unwanted water or other liquid into your mouth while starting a siphon? This writer has, and the "taste" has lingered for some time. Heretofore the starting of a siphon has not been enjoyed by the writer. Now he does enjoy even that by making the simple addition of a glass tube to the hose as shown in the accompanying sketch.



By using a glass tube you are enabled to "see" the liquid as it comes up. You can then stop the liquid wherever you wish, before it reaches your mouth, at the point marked "To here" in the sketch. Then pinch the tube with your fingers to prevent back flow, place your finger over the end of the glass tube to hold the vacuum, lower the free end to the position shown dotted, and no trouble whatsoever will be experienced.

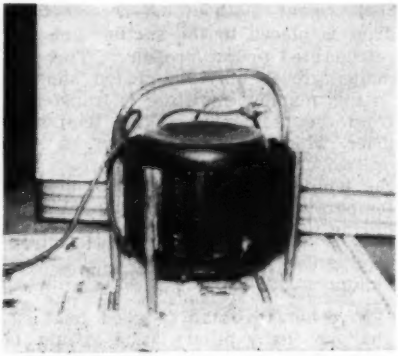
A glass tube, also, can be kept clean easily so that, to create the initial vacuum, one is not likely to use one's mouth with any hesitancy.

This method is also quicker, surer, and better than starting by laying the hose in the liquid and stopping both ends, or filling the hose with a funnel and dipper, etc. This method always works the "first time."—*Submitted by W. F. Schaphorst, Newark, N. J.*

★ ★ ★

PORTABLE VACUUM PUMP

HERE is a picture of a vacuum pump I made from an old Frigidaire Meter Miser. The handle and legs are made of ½" copper tube, brazed on to the fins. I use a snap switch in the start winding instead of a relay. This makes a very good portable, light weight vacuum pump that will pull 29" vacuum.—*Submitted by Wm. Hintz, Massillon, Ohio.*



ABSORBING SO_2

HERE is my method of purging sulphur dioxide: Use one gallon glass jug. Pour in one quart of household ammonia. Run purge line to bottom of jug. Open machine and let go. The result is-no smell-no heat-no boil over as with lye—no waiting for lye to dissolve. —*Submitted by S. Anderson, Poughkeepsie, N. Y.*

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BARE COPPER TUBE COILS

WHEN calculating the size and length of bare copper tube coil required for any particular application, or when calculating the Btu. capacity of any bare copper coil, there are several factors which must be taken into consideration.

The length and diameter of the tube and the temperature difference between the refrigerant in the tube and the air or liquid around the tube are, of course, the first factors to be considered. Next, however, is whether this bare pipe coil will operate in still air or at what rate of movement the air will be passing over it or if the coil is to be submerged in a liquid, whether the liquid will be circulated and at what rate.

The table included here provides "K" values for bare copper tube or pipe for still or moving air at various velocities and for still liquid or circulated liquid at various velocities and for various temperatures. Using this table, our formula for calculating the capacity of a given length of bare pipe will be as follows:

$$K \times \left(\frac{3.1416}{12} \right) \times D \times L \times TD$$

where "K" is the "K" factor given in the accompanying table under the conditions selected, D is the diameter of the tube in inches, L is the length of the tube in feet, and TD is the temperature difference between the evaporating refrigerant and the air or liquid.

For easy reference, that part of the formula enclosed in brackets may be reduced to a multiplying factor of .26—thus our formula will become "K" x .26 x D x L x TD.

"K" OR HEAT TRANSFER COEFFICIENTS FOR BARE PIPE OR COPPER TUBING BTU. PER HOUR PER SQUARE FOOT PER DEGREE F. TEMPERATURE DIFFERENCE

	In Still Air			
Fixture temperature	0°	20°	40°	60°
"K"	1.85	2.0	2.2	2.4

	In Moving Air						
Air Velocity ft./min.	200	300	400	500	600	700	800
"K"	3.3	4.5	5.6	6.6	7.7	8.6	9.6

	In Liquid				
Still Liquid	No ice on coils "K"-12.		Some ice on coils "K"-8		
Circulating liquid ft./min.	20	25	30	35	40
"K"	18	20	22	23.7	25

"Yes—I know just how you feel, Mrs. Smith."

QUESTIONS AND ANSWERS

The following are more of the questions and answers discussed during the "Information Please" sessions at the annual convention in Cleveland.

POSITION OF DRIERS

QUESTION: This is in regard to driers. If you put the drier on a straight run out of your compressor, you have a tendency to make the drier agent break down by agitation. Then, if you put it on the other way, where it flows down, you have a tendency to pack. I would like to have a comment on that.

ANSWER—By J. H. Spence: From a practical approach, I just want to say that it is an old, known fact that as the temperature of the refrigerant is reduced, the less its capacity to hold moisture in suspension. It is also known that as the temperature of the desiccant is decreased, it increases its capacity for adsorption of moisture. Since the desiccant has a greater affinity for moisture as the temperatures lower, then the greater degree of dryness of refrigerant can be reached by placing the dehydrator in the coldest possible location. I would say it should be placed ahead of the expansion valve, but there are some men in the industry who are recognized as being authorities who state that the dehydrator can be placed after the expansion valve.

Comment by Dr. W. O. Walker: There is quite a nice little argument going on about the position of drier units in the refrigerating system. Let me say that there is only one common sense rule to follow, and that is one which brings the refrigerant in contact with the drier for the maximum period of time. In our tests we have used the drier in an upright position, with the liquid refrigerant passing up through it. I realize that there are some opinions contrary to that practice, but that gives every opportunity for the moisture to come in contact with the drier.

If you turn the direction of flow and let the refrigerant trickle down through, and the unit is of an ordinary type, you will get just as good drying as you will if the liquid comes up from the bottom. If you have large-particle size drier material in the unit, and you trickle in from the top, the liquid will get through without getting the correct drying. We have completed laboratory tests where the particular size of drying material was four-to-eight mesh, and we got just as good results from the top down to the bottom as vice versa. If you have a larger mesh, twice the four mesh or above that, you do not get as good drying coming from the top down to the bottom.

The pulsating effect mentioned, where you kick the material upward and keep it in agitation as a result of the opening and closing of the expansion valve, is supposed to produce some grinding of the particles of the drying agent. However, we have been using driers for a good many years and this is about the first year I have heard very much about this particular thing. There are tests going on at the present time which will reveal whether there is any actual difference in drying. The silica gel people recently announced at the ASRE convention in Atlantic City, that they are producing a type of silica gel which has been given a pre-treatment. They tumble it and knock off all the corners. If that is true you shouldn't have any trouble from the pulsating effect.

We will probably have some information on this in a few months and when we do we will try to make it available to all. I, myself, think that you can go on putting that liquid in at the bottom and out at the top without doing any harm. But let's prove it first and then we will give you the information afterward.

QUESTION: I had one installation that I had occasion to observe recently, con-

sisting of a large room of a hundred thousand cubic feet of meat storage space, using some forty-eight thermostatically controlled expansion valve feeds. The installation was made with a silica gel drier in the liquid line immediately ahead of each expansion valve, making forty-eight driers installed on these coolers. When I inquired as to the reason why a good drier was not installed, in one location, the answer was that if one particular expansion valve would begin to accumulate a little water, that the drier would be right in the liquid line in a position to arrest the moisture.

I have my own opinion on that installation. I would just like to have some comment on the installation of individual driers ahead of each unit.

ANSWER—By Dr. W. O. Walker: The only purpose in having a drier in the line is to keep the water from reaching the expansion valve and freezing it up. Consequently, if you have one drier, adequately sized for the single liquid line, and were certain that the individual lines branching off and going to each one of the thermostatic expansion valves were all dry, then there isn't any reason why the liquid line should not have one single drier for all these units. There isn't anything theoretically wrong with having a drier in front of every expansion valve, and I don't suppose that anyone who is selling drier units would object to that as a policy.

SEAL NOISE

QUESTION: How can you stop the squeal of a seal installed on a Norge or other compressors?

ANSWERS and comments from audience: . . . "Replace it with a Norge factory seal. Ordinarily a seal squealing is due to the lack of lubrication, and it is quite possible that the oil might not be getting to it." . . . "Sometimes if you just loosen up the bolts that hold the seal and turn the seal bellows around so the lubrication gets in, that helps." . . . "Just get a little lubrication started between the surfaces." . . . "You can do it, sometimes, on reciprocating compressors by reversing the direction." . . . "Add a little more oil in the system." . . . "On the Norge seal, I have found that the original seal squeaked as well as a replacement seal. I have noticed that the squeak developed when the compressor holds 22 ounces of oil. The only thing which seems to be causing the squeak is the high pressure on the high side. Whether or not that pressure is too great for it, I don't know." . . . "Any make of seal may squeal. A lot of squealing seals are caused by the lack of lubrication. Also unequal spring distribution cocks the seal a little bit on one side and that causes a squeal. A little burr on the edge of the nose will cause a squeal—which gets back to the lack of lubrication. Those little, fine burrs are holding the whole pressure of the seal, and the pounds per square inch of pressure on that particular portion of the seal is very high. It doesn't allow the oil to get in or, if any oil does get in, it pushes out very promptly. Look for such things as a sharp edge or uneven pressure of the seal or lack of oil to the seal as being, usually, the causes of squeaking seals." . . . "Another thing I have noticed is that the material in the seal sometimes has a hard spot on it and by lapping that down it takes the squeak out." . . . "At the end of the shaft on the Norge there is a little thrust bearing. In that thrust bearing there is a little pin that comes out and sometimes gets behind the thrust bearing and throws the shaft forward, causing the squeal. If you lap that thrust bearing down and make another pin that will let the shaft go back into place, that will take the squeal out of it."

ZINC OR ALUMINUM WITH REFRIGERANT

QUESTION: What about the use of zinc coated steel with Freon?

ANSWER—By P. B. Reed: I have used a good deal of methyl chloride and have been around a good many installations. Quite a lot of them have been installations using iron pipe. Some of the installations using iron pipe happen to be galvanized inside. Ordinarily there should be no very great necessity for galvanizing inside. But I have seen them and I did find that the methyl chloride attacked the zinc.

I ran across an installation some years ago where there was every evidence of aluminum being in the system. It had all the symptoms. There was the white

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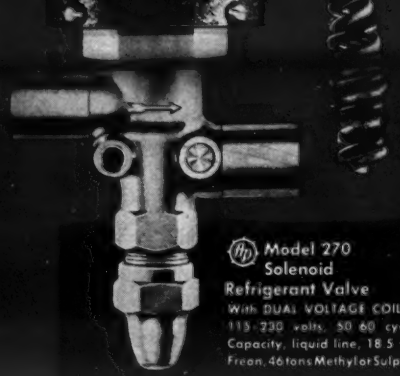
application. For instance, the SAME soleniod can be used for: *115 or 230 volts — 50 or 60 cycles* — either 5/8" or 7/8" tubing. You would need



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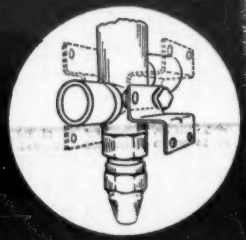

in your service kit

application. For instance, the SAME soleniod can be used for: *115 or 230 volts — 50 or 60 cycles* — either ⅝" or ⅞" tubing. You would need EIGHT VALVES in your kit to cover ALL these conditions handled by ONE A-P Model 270 Solenoid.

A-P DEPENDABLE Model 270 Solenoid, with its simple, positive "Pilot Operation" requires only minimum power. Pressure holds the valve tightly shut. When current is applied, the plunger is pulled part way up, opening the pilot port and allowing pressure to leak to the pressure side. Then, with pressure above the piston reduced, the pressure below the piston opens the main valve port. The plunger, moving on upward, holds the piston away from the port, requiring no pressure drop to hold the valve open. A three-point stop, used in conjunction with a "shading coil" makes operation quiet and vibrationless. Manual opening stem is provided for use in case of current failure.

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smoke and the flammable gas that escaped, and a flash effect. It had all of those indications but there was no aluminum in the system. We finally ran it down to some zinc plates that had been put in the dehydrator. The dehydrator had originally been intended for sulphur dioxide, and we got the same reactions from that, that we got from aluminum.

QUESTION: Is there any reaction on ammonia and aluminum?

ANSWER from audience: Ever since aluminum tubing has come out for the industry I have used it for ammonia and I have found no reactions taking place. The only thing in regard to using aluminum tubing is in going down through wood. If there is going to be moisture around it you must put an insert in there to keep the tubing from making contact with some sort of an acid condition that will eat through from the outside,

I have taken tubes apart and cut them up to see if there was any reaction—any pitting or anything like that taking place, after a period of years, and nothing has happened at all. I use it on installing plates in trucks because you have a certain amount of elasticity with it,

CALCULATING CAPACITY OF MACHINE FROM ICE CONSUMPTION

THE following data should be helpful to the serviceman who is called upon to convert an ice box over to refrigeration. The box about which I write is in good condition and uses 100 lbs. of ice per 24 hours. It is to be changed over to mechanical refrigeration and is a sweetwater bath system for cooling bottled drinks. The maximum temperature will be 100 degrees. I intended to use ⅜ inch tubing for coil. Now assuming the present box temperature is okay and assuming that the 100 lbs. is for average outside temperatures during the summer months, which will be about 75 degrees, and the maximum outside temperature is, as I stated above, 100 degrees, I proceeded to work the problem on this basis.

Since 100 lbs. of ice are used to cool the box at present, we can say that it will require a machine and coil with a 100 I.m.e. rating per 24 hours. Assuming the bath temperature required in both the present and future cases to be about 38 degrees, which should be cold enough for this purpose, we will have a temperature difference in the first case of 75—38, which equals 37 degrees, and in the second case of 100—38, which equals 62 degrees. To correct the machine and coil capacity to take care of the maximum conditions, we will have to have one with a capacity of $\frac{100 \times 62}{37}$ which equals 168 I.m.e. per 24 hours. This machine, however, will not run 24 hours but will probably be required to run a maximum, under average conditions, of 16 hours per day and will therefore have to have sufficient capacity to produce 168 I.m.e. in 16 hours or $\frac{168}{16}$ which equals 10.5 lbs. per hour. Converting this to Btu.'s we will have 10.5 x 144, which equals 1,512 Btu.'s per hour. Referring to a manufacturer's catalog we will probably find that a ¼ hp. machine will take care of this load satisfactory.

Since we will probably require a coil temperature of about 26 degrees, or an average suction pressure with methyl of 18 lbs., and since we will probably acquire a heat transfer of about 9 Btu. per square foot of coil surface per degree difference between water and refrigerant temperature, we will then require $\frac{1512}{9 \times (38 - 26)}$ which equals 14 sq. ft. of surface. ⅜ inch tubing will have $\frac{3.1416 \times .375 \times 12}{144}$ which equals 0.98 square feet of surface per foot. This means, then, that we will require $\frac{14}{.098}$ or 143 feet of tubing, which would be too much for use for one expansion valve. We will, therefore, go to ½ inch tubing, which will give us $\frac{3.1416 \times .5 \times 12}{144}$ which equals .131 sq. ft. or $\frac{14}{.131}$ which equals 107 feet of ½ inch tubing required.

The Taft Hartley Law

By NATHAN EDELSTEIN

In keeping with its policy of informing members on various legislative enactments which affect refrigeration contractors, NARC's recording Secretary and national legislative chairman Nathan Edelstein, in the following gives his opinion on the Taft Hartley law. Mr. Edelstein, who is also general counsel for Refrigeration and Air Conditioning Guild, Inc. of New York, has devoted much time to the study of labor laws.

Nathan Edelstein, left, and Ralph Lampie, both officers of NARC, discuss provisions of the Taft Hartley law.

THE Taft Hartley Act was not the first labor law passed in recent times. The first of the modern labor laws was the N.R.A. which was passed in 1933 and declared unconstitutional in 1935. The N.R.A.'s main purpose was to establish "codes" of fair competition. Representatives of both employers and Unions met together to establish these "codes" under the supervision of the federal government. The "codes" provided for minimum wages, maximum hours and a guarantee to labor to organize and bargain collectively. The Wagner Act also known as the National Labor Relations Act, was passed in 1935, and unlike the N.R.A. was declared constitutional in 1937. The Wagner Act established a greater equality of bargaining power between employers and Unions by requiring employers to deal with Unions which represented a majority of their employees in an appropriate bargaining unit. It made it an unfair labor practice for an employer to discriminate in any way against his employees because of their union membeship or activities. The Wagner Act, different from the N.R.A., had no jurisdiction over the contents of collective bargaining contracts. It did not specify what should or should not be in contracts, nor how bargaining should work. It merely provided that both parties should sit down around the bargaining table and negotiate. It provided that when an employer and an employee agreed on the terms of employment, the agreement must be reduced to writing and signed by both parties. The National Relations Board, the agency appointed to enforce the Act, made various regulations and these regulations after being tested in the Courts, became and is the prevailing law. Nothing in the Wagner Act allowed the N.L.R.B. to force the carrying out of the terms of the contract. Only the general law of contract was used to enforce the agreement. The Taft Hartley Act, otherwise known as the Labor Management Relations Act, was passed on June 23, 1947, as Public Law 101. This law modifies the Wagner Act. It was held by the proposers that the Taft Hartley Act balanced the equities between employer and employee, giving the employer some of the rights which had been taken away from him by the passage of the Wagner Act and by the various regulations of the N.L.R.B. and the interpretation of these regulations and of the Wagner Act.

It is important to note that both the Taft Hartley Law and the Wagner Act deal only with firms that are engaged in interstate commerce. The Wage & Hour Act, or the Fair Labor Standards Act, deals with this interstate problem in more detail.

In addition to the N.R.A., the Wagner Act and the Taft Hartley Law, there are

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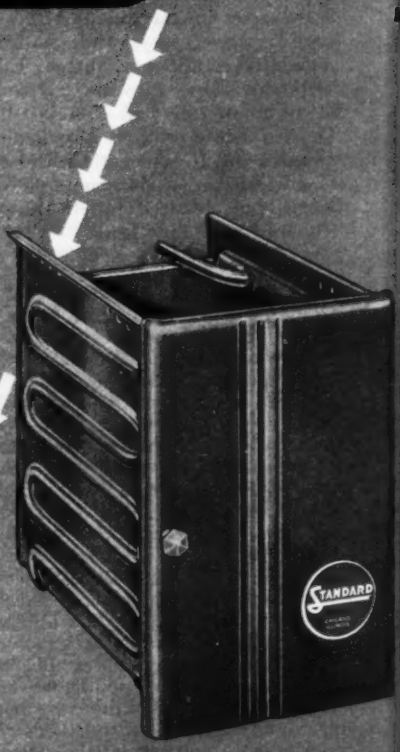

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many other important Federal laws, which deal with labor problems. The Wage & Hour law is one of the most important. Its purpose is to prevent the spread or the perpetuation of labor conditions detrimental to the health, efficiency and well being of workers and to prevent unfair methods of competition based on such labor conditions. It establishes a minimum wage of 40c an hour and time and a half for all hours worked over 40 hours.

Another Federal law is the Norris-LaGuardia Act passed in 1932. It regulates the issuance of injunctions by federal courts in labor disputes by setting forth certain precedentery conditions before an injunction can be granted and prohibits outright the enjoining of certain other acts. This law however, has in a large measure been repealed by the Taft Hartley Act.

Labor Relations of the Railroads and Air Lines are covered by the Railway Labor Act of 1926.

The National Labor Relations Board enforces the various labor laws. In conjunction therewith there is a National Mediation Board. The Railway Labor Act of 1926 establishes the National Railroad Adjustment Board which makes final decisions on disputes arising out of grievances between carriers and employees.

Besides these federal laws stated above, there are many state labor acts. Prior to the passage of tthe Taft Hartley Bill, some employers preferred to use their state labor laws whenever applicable for its labor relations and for the settling of labor disputes. Since the passage of the Taft Hartley Law, employers, who formerly did not care whether the state or federal labor board took jurisdiction, now feel that the Taft Hartley Law gives them more adequate protection than the state law and are therefore trying to establish the interstate nature of their business in the courts.

Our problem in commercial refrigeration then, is a two pronged, almost contradictory set of affairs. To date it has been our contention that commercial refrigeration contractors are generally in intrastate business. If we wish to come under the Taft Hartley Law, our business necessarily would have to be interstate in character. Therefore, each contractor must determine for himself or itself whether his business falls within the category of interstate or intrastate. If after careful consideration, it is determined that the business is intrastate in character, then the Taft Hartley Law does not apply.

Significance of the Taft Hartley Act

The most significant change brought about in the labor law by the Taft Hartley Law was in the bargaining process. No one should sign a Union contract under the Taft Hartley Law without having counsel in constant attendance. The lawyer must cope with an intricate and voluminous code which is as unreadable, dull and soporific, as a trust indenture. When the act was passed, a Washington wit jokingly quipped, that is was "hell for the Unions, purgatory for the employers, and heaven for the lawyers". The law creates the necessity that those who engage in collective bargaining must have a technical and legal understanding of what can and cannot be done to safeguard the interest of the parties they represent. The entire contract and every clause thereof must be negotiated and written with the view that a third party is sitting in on the drawing up of the contract, and that party is the Taft Hartley Act itself for even a clause agreed to by both labor and management can be effectively vetoed if it violates the Taft Hartley Act.

Coverage of the Law

Again it is reiterated that the Taft Hartley Act applies only to employers and companies engaged in interstate commerce as that term is used and defined by the N.L.R.B. and the courts. Those firms whose businesses are of purely local nature continue unchanged and uneffected by the new law. However, it appears that the coverage of the law has been extended and therefore there will be many concerns covered by the Taft Hartley Act that were not covered by the Wagner Act. Even before negotiators sit down across the bargaining table, they must determine first whether or not the firm involved is engaged in interstate commerce and if it comes under the Taft Hartley Act. If the Taft Hartley Act applies, then the prohibitions within the Act, making illegal certain types of clauses must be con-

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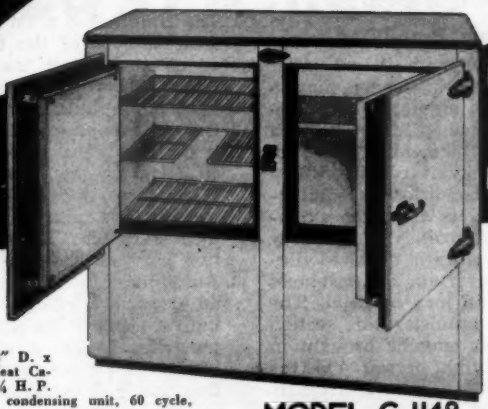

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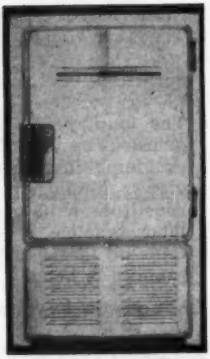

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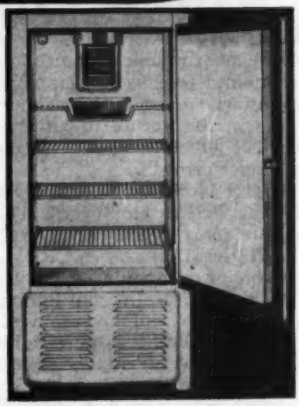

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sidered although these clauses have been in contracts going back as far as the history of collective bargaining in the U. S.

Closed Shop Prohibited

The closed shop is made illegal under any circumstances. No longer may a contract require an employer to obtain new employees from a Union, although he may voluntarily take employees from the Union. Nor may it require Union membership as a condition of employment. Thus employers are given exclusive control over hiring. Compulsory checkoff of Union dues is declared illegal although under certain circumstances a voluntary checkoff may be legal. The NLRB does not administer this section of the law. A suit may be brought in court by any injured person and the Federal District Courts are specifically authorized to grant unjunctions against these violations and in this way amending the National Labor Anti-Injunctions Act. (Norris-LaGuardia Act.)

Unfair Labor Practices

"Featherbedding" practices are made illegal by the Taft Hartley Act. It is an unfair labor practice for a Union to cause or attempt to cause an employer to pay or deliver "any money or other thing of value in the nature of an exaction for services which are not performed or not to be performed".

Unfair labor practices apply to unions now as well as employers. The following are some of the unfair practices declared illegal:

1. Coercion of employees in their right to join or refrain from joining Unions.
2. Coercion of employees in the selection of their bargaining rights.
3. Inducement of employers to discriminate against workers by reason of membership or non-membership in any Union.
4. Refusal to bargain collectively. The evil being corrected here is the practice of some Unions in submitting contracts on the take-it-or-leave-it basis.
5. Certain types of strikes and boycotts including Jurisdictional strikes.
6. Excess or discriminating initiation fee for employees.
7. Causing or attempting to cause employers to make "featherbed" payments. This is aimed at make-work or other featherbedding practices.

Some advantages of the Act to employers not hitherto possessed by them are:

1. The Union shop must be approved by at least 50% of the employees after an election under the jurisdiction of NLRB. There can be no consent between union and employer.
2. Before certifying a Union as a collective bargaining representative, the NLRB must now conduct an election. When the employer declines to recognize the petitioning Union as his employees representatives, such an election may still be held on consent.
3. An employer may himself petition for an election, alleging that one or more individuals or labor organizations have presented to him a claim for recognition. This claim for recognition must find that a question of representation exists.
4. The employees of any craft, if they so desire, may petition that their craft, be carved out of the larger bargaining unit and as a corallary it precludes the fusion of craft with industry bargaining units where specialized workers desire to be represented by craft rather than by industrial unions.
5. The Taft Hartley Law now provides that striking employees who are not entitled to re-instatement are ineligible to vote.
6. The employers' free speech is safeguarded by specific enactment (8c) providing that the expression of any views, arguments, opinions, shall not constitute or be evidence of an unfair labor practice, if the expression contains no threat of reprisal or force or promise to benefit.

Changes in the Union Shop Clause

The Union shop as differentiated from the closed shop may be included in the contract, if certain conditions are met. The Union must be the exclusive bargaining agent of a majority of the employees. A petition of at least 30% of the employees in the bargain unit must be submitted to the NLRB requesting a Union shop referendum. The question before the board is and should be, "Do you wish to authorize "XYZ" Union to negotiate with your employer for a contract requiring membership in the "XYZ" Union, as a condition of employment?". The Union must obtain

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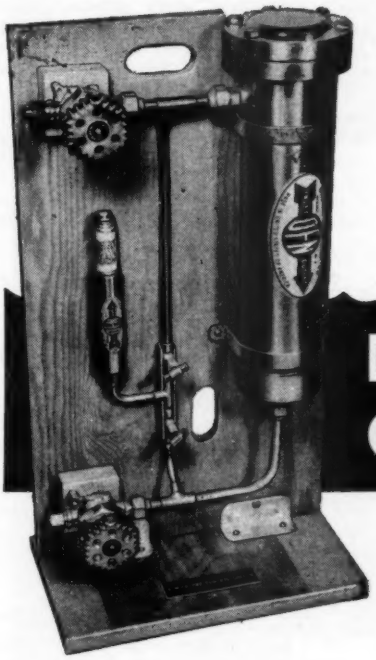

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Systems slowed down or stopped by moisture can usually be restored to normal operation in 15 to 30 minutes, with the DFN Moisture Control Unit. A single pass of the refrigerant thru the Unit dries down to —20° dew point . . . to —60° dew point in 24 hours. Dries at refrigerant temperatures up to 150° F.

The DFN Moisture Control Unit is portable, easily attached to liquid line. It tells if system is wet—thoroughly dries it—then tells when dry. May be used in field, shop or factory. One cartridge has capacity to dry equivalent of ten one-ton systems—or over 13 teaspoonfuls of water. Also ideal when charging new or old installations.

The DFN Moisture Control Unit quickly repays its cost by saving time, eliminating guesswork, reducing call backs, getting systems back in action faster. See the Unit at your wholesaler. Write us for detailed literature.

Saved dismantling. Pipe coil job in brine, *under contract*, loaded with moisture. Resisted all drying efforts. About to tear down job when DFN Moisture Control Unit tried. After 30 minutes, operating normally. Service time 1 hour, no parts needed.

Saved merchandise. ¾ hp. Reach-In Display Box unable to get lower than 48-52°, despite 18 service calls. $200.00 in merchandise already lost. DFN Moisture Control Unit indicated high moisture content. Within less than one hour temperature down to required 35° and system operating on normal cycle.

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the affirmative vote of a majority of those eligible to vote in order to request a Union shop clause. If a Union shop clause is contained in the contract, it must give employees at least 30 days in which to join the Union. The Act also gives to 30% of the employees the right to petition for a referendum to rescind the Union shop clause.

In some states, the Union shop as well as the closed shop is illegal even after the above described procedure has been followed. The Act states that where a state law prohibits the execution or application of a Union Shop contract, the state law shall be considered as taking precedence over the Federal Law. In all other provisions of the Law, state laws do not effect the Taft Hartley Act.

Check Off Clause

The check off of Union dues is legal only under certain circumstances. The only moneys allowed to be deducted from employees' salaries must be solely for dues or initiation fees. No other deductions are allowable. Before even these deductions are made from an employee, that employee in person, must individually and in writing, authorize the employer to deduct such dues and initiation fees, from his salary. This voluntary authorization can be made irrevocable, but in no case for a greater period than one year.

An employer is specifically forbidden to discharge an employee because of suspension from the Union, if the employer has reasonable grounds for believing membership was not available on the usual terms and conditions, or if the employer has reasonable grounds for believing that such membership was denied or terminated for any reason other than failure to pay dues and fees uniformly required. Apparently then, under the Taft Hartley Law non-payment of dues, or initiation fees is the only grounds the union has in a union shop agreement for requesting the discharge or suspension of a member. The amount of an initiation fee as related to compulsory membership under a Union shop, must be one the Board finds as non-excessive or discriminating under all the circumstances, and if the board finds it so, it is declared an unfair labor practice for the Union in question.

The Termination of Contract Clause

No contract shall be terminated or modified unless the party desiring the change serves a 60 day written notice upon the other party of such intent, offers to meet and confer with the other party and serves a 30 day notice on the Federal Mediation and Conciliation service and the proper State Mediation Agency of the existence of a labor dispute. The parties must refrain from engaging in a strike or lockout during the 60 day period following the original notice. The failure to follow this procedure is an unfair labor practice for either side.

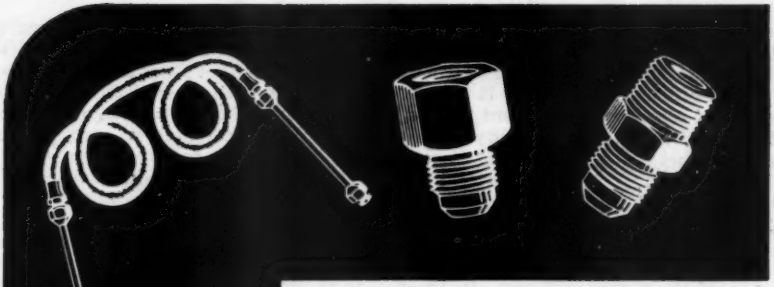
Prohibition of Certification of Certain Employees

Certain employees may not be certified by the NLRB. The act provides that the NLRB shall not certify a group consisting of supervisors. It further provides that no Union guards may be certified if it belongs or is indirectly affiliated with a labor organization containing employees other than guards. It further provides that any profession or craft must be given an opportunity to vote on separate representation before it is placed in a larger unit.

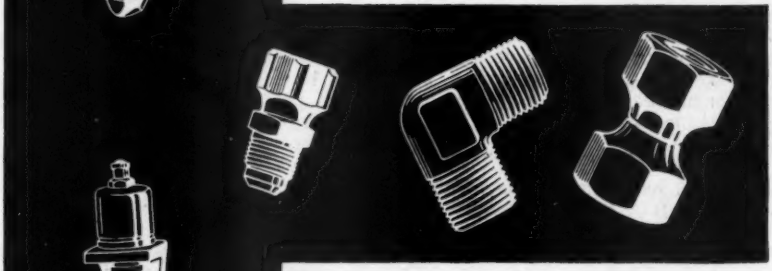
Filing of Certain Union Facts

As a prerequisite to using the NLRB, a union must qualify by filing certain information and affidavits with the Board. Failure to file means that a Union cannot bring an unfair labor practice proceeding against the employer or petition for a representation election or a union shop referendum. However, the union may still be charged with unfair labor practices and is subject to injunction, cease and desist orders, and all other forms of litigation. The data required to be filed includes the salaries of union officers, description of union procedures, rules and regulations, financial data, and other similar information. The officers of the Union, both national and local, must sign affidavits that they are not members of the Communist party and do not believe in the overthrow of the U. S. government by force or by illegal methods.

The new law has had and will continue to have a tremendous impact on col-



Electrimatic makes a complete line of precision engineered Automatic Control and Regulating Valves, Quick Couplers, Refillable and Non-Refillable Driers, Strainers, Charging Lines, Flare Nuts and Fittings.



You can get full information on any product by writing for a copy of our catalog. It will pay you to buy Electrimatic Products from your Wholesaler. He can give you prompt delivery on most any item.

Electrimatic

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lective bargaining. This short opinion should not be treated as an answer to all the many problems which will arise under the Taft Hartley Law. It is merely a brief survey of the present status of the Law. The interpretation by the Supreme Court of any and all of its provisions, which of necessity must come, will help to clarify the operations and effects of the law. Both union and employers should follow closely the provisions of the Act with the constant guidance of their legal advisers. In interpreting sections of the Act, due consideration should be given to the decisions and precedents established by the NLRB.

The Act was passed to prevent and mitigate "industrial strikes which interfere with the normal flow of commerce". This Act is set up to avoid such strikes by providing that labor and management "recognize each others legitimate rights" and to make known to both management and labor "that neither party has any right to engage in any act or practices which jeopardize public health, safety and interest".

If both employer and Union will guide themselves in interpreting the Taft Hartley Act when negotiating a labor contract, by heeding the spirit of the law instead of the letter of the law, peace and harmony between labor and management will prevail and both the employees and employers are sure to benefit therefore.

CONTRACTORS' REPLY TO A.C.R.M.A.

THE article appearing elsewhere in this issue which A.C.R.M.A. publicly states its position on the licensing of refrigeration and air-conditioning contractors has been read and noted with considerable interest by N.A.R.C. In reply they state:

"We were indeed sorry to learn that A.C.R.M.A. has adopted this policy for we of N.A.R.C. firmly believe that licensing of refrigeration and air-conditioning contractors is an industry job. If you will refer to the June issue of The Refrigeration Service Engineer, we stated this when announcing our policy of assisting on licensing regulations in all areas where legally applicable.

"It is the considered opinion of the Directors of N.A.R.C. that unless prevalent abuses and conditions are corrected voluntarily, by the contractors, in conjunction with the other segments of the industry, detrimental and restrictive legislation is bound to be passed by city and state governments.

"The decision of N.A.R.C.'s directors was reached after a thorough poll of our members who are some of the largest and smallest contractors in the country.

"Certainly, A.C.R.M.A. must be cognizant of the abuses, malpractices and unsavory acts which were not only prevalent among manufacturers, wholesalers and retailers in other fields and thus endangered the public health and safety but in some cases even resulted in National scandals. The result was licensing and regulations designed to give the public maximum protection.

"Let us take a look at a few of the fields in which licensing, whether by city, county, or state is in effect.

"The medical profession, dental and legal professions, cosmotologists, beauticians, barbers, pharmacists, restaurateurs, grocery, meats, drug manufacturers, stationary and marine boiler operators, practically every trade and profession has its own regulations.

"We recognize, for example, the medical profession, as perhaps the ultimate in man's forward march of progress, then, who is the one to say that the air-conditioning and refrigeration contractor is above and beyond all need for regulations and that any one who cares to designate himself as a contractor and operate out of a satchel at the expense and risk to life and safety of the consuming public is free to do so?

"If a doctor were not licensed, we could all buy surgical paraphernalia and drugs, hang out a shingle and call ourselves "Doctor".

"N.A.R.C. cannot believe that the manufacturers of these surgical instruments and drugs could look with pride on that sort of a condition nor do we believe that the manufacturer of air-conditioning and refrigeration equipment would any sooner see their products placed in the hands of unqualified men to install and service.

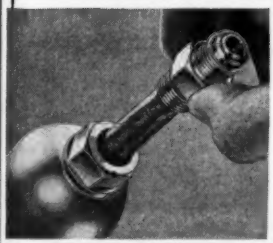
"It is not the purpose of N.A.R.C. to fetter competition, but rather to promote

IMPERIAL
TORPEDO DRIERS

®

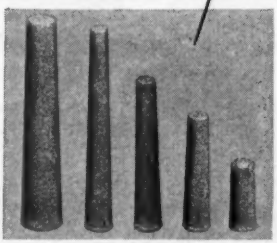
. . . designed for faster, more efficient drying action
. . . far longer operation without cleaning

Dust-Free Silica Gel assures more efficient drying action.
Brazed—no soft solder joint that might loosen.
One-piece copper shell. Fewer joints — less chance for leakage.
The TORPEDO
IN
DRIER
OUT
THE MOST FORMIDABLE WEAPON IN THE WAR ON MOISTURE
MADE BY THE IMPERIAL BRASS MFG. CO. CHICAGO, U.S.A.
COPPER AND BRASS CONSTRUCTION
Easy to refill. Hex on both fitting and shell.
Greater filtering area. Finger-type, metallic depth filter is graduated with drier capacity.
Copper and brass construction.



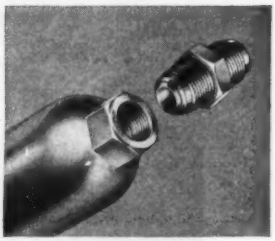
EASILY REFILLED ON THE JOB

Two generous wrench holds, one on inlet fitting and one on shell, make it easy to open drier for refilling. No bolts to unscrew . . . no flanges or rings to remove. No soldering required after refilling.



GRADUATED FILTERING AREA

Size of metallic depth filter is graduated with drier capacity. This assures ample filtering area on larger units. Element is composed of innumerable small bronze particles fused together in a controlled atmosphere.



INTERCHANGEABLE CONNECTIONS

30, 50 and 75 cu. in. sizes have female flare threads on both inlet and outlet which are fitted with male flare unions. To change size, simply replace union furnished with reducing union of desired size.

A complete line to meet all refrigeration applications. Capacities rated in accordance with REMA recommendations. All eight sizes—1/6 to 7-1/2 HP . . . 3 to 75 CU. IN. capacity—are furnished complete with flare nuts and copper seal caps.

Ask for your copy of the new Catalog No. 80 covering the complete IMPERIAL LINE.

SEE YOUR JOBBER!

THE IMPERIAL BRASS MFG. CO., 534 South Racine Avenue, Chicago 7, Illinois

IMPERIAL

Fittings • Valves • Driers • Filters • Flares • Charging Lines
Tools for Cutting, Flaring, Bending, Pinch-Off and Swedging

a healthy state of free enterprise with maximum protection to the consuming public and a sense of security to the responsible, dependable and qualified business man.

"N.A.R.C. stated before and we reiterate that we firmly believe this is an industry job and we heartly welcome the cooperation of all groups in the current problem."

★ ★ ★

CHATTANOOGA JOINS NARC

HAVING recently completed organization plans, the Refrigeration Contractors Association of Chattanooga, Tennessee have joined N.A.R.C.

This makes the twenty-sixth local association to affiliate with the National Association of Refrigeration Contractors.

Headquarters of the Chattanooga group have not as yet been decided upon. Meetings are temporarily being held in the offices of B. C. McCall, President of the association, and president of the Gereral Equipment Company Inc., 501 Dodds Avenue, Chattanooga 4, Tennessee, distributors for Tyler and Mills Compressors.

Other officers are; Vice-President, Walter Young Jr., distributor for Warren, Secretary-Treasurer, J. B. Corlew, distributor for Worthington, and Sgt. at Arms, Abe Prebul, Prebul Refrigeration Company.

The new group will give unfair trade practices and labor problems their first attention. On these matters they have already received information from N.A.R.C's National office.

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CANTON FORMS ASSOCIATION

A GROUP of refrigeration contractors held a meeting recently in Canton, Ohio for the purpose of forming a local association in that area and to eventually affiliate with N.A.R.C.

Emil Flanick, National Chairman of N.A.R.C.'s Guarantee Committee, and Joe Helminak, Executive Vice-President of N.A.R.C. addressed the group and told of the things that can be accomplished thru cooperative effort which otherwise cannot be accomplished individually.

Leonard Petry was elected as temporary chairman pending the next meeting of the group.

Officers and members of the Chattanooga Contractors group pictured here are seated, left to right: J. B. Corlew, Corlew Engineering Co., Secretary-Treasurer; Walter Young, Jr., Walter Young, Jr. Co., Vice-President; B. C. McCall, General Equipment Co. Inc., President; and Abe Prebul, Prebul Refrigeration Co., Sergeant-at-Arms.

Standing, left to right: Horace Evans, Chattanooga Refrigeration and Air Conditioning, Inc.; C. C. Campbell, Chattanooga Scale and Fixture Co.; Arthur Jones, J. W. Brooks & Son; Bob Batson, Lemmer, Horrell; Clair Smith, Southern Blow Pipe and Roofing Co.; and Ed Lawson, Lawson Refrigeration Service.

2 new appliance testers by Simpson

MODELS 391 and 392 A.C. - D.C. Volt-Wattmeters

INSTRUMENTS THAT STAY ACCURATE

These two Simpson testers are designed for simultaneous reading of volts and watts. Each has two separate 3" square meters, one for volts and one for watts. Each has built-in cord and plug for connecting to line outlet, and receptacle for connecting appliance under test. There are no leads to connect. Readings register immediately when plugs are connected. Separate, uncrowded scales make quick, accurate readings easy. Each meter has two ranges, selected by separate toggle switches with positions clearly indicated by white figures recessed in the molded bakelite case. The low power consumption of these instruments and their high efficiency result in negligible loss and error in reading.

Model 391 (3000 watts max.)
Ranges, A.C. or D.C.
Volts: 0-130, 0-260
Watts: 0-1500, 0-3000
Size: 3" x 5⅞" x 2½"
Weight: 2 lbs.
Shipping Weight: 3 lbs.
Dealer's Net Price.....$30.00

Leatherette Carrying Case—$5.00

Model 392 (5000 watts max.)
Ranges, A.C. or D.C.
Volts: 0-130, 0-260
Watts: 0-1000, 0-5000
Size: 3" x 5⅞" x 2½"
Weight: 2 lbs.
Shipping Weight: 3 lbs.
Dealer's Net Price.....$35.00

SIMPSON ELECTRIC COMPANY
5200-18 West Kinzie Street
Chicago 44, Illinois
In Canada, Bach-Simpson, Ltd.
London, Ont.

NEWS AND ACTIVITIES

COMING CONVENTIONS

New England States Association Conference and Exhibits

Place: Hotel Bradford
City: Boston, Mass.
Date: October 8, 9 and 10, 1948
General Chairman: John J. Madden, 212 Madison Street, Dedham, Mass.

11th Annual RSES Convention and R.E.M.A. Exhibition

Place: Sherman Hotel
City: Chicago, Illinois
Date: November 19-22, 1948
Secretary: H. T. McDermott, 433 North Waller Ave., Chicago, Ill.

Illinois State Association

Place: St. Nicholas Hotel
City: Springfield, Illinois
Date: September 25 and 26
Secretary: B. V. Clark, 612 N. May Street, Aurora, Illinois.

MONTANA STATE ASSN. FORMED

THE Midland Empire and the Northern Montana Chapters held a State meeting in Helena on May 15 and 16. International Director O. C. Yates spoke on the advantages of a state organization, and then showed the new line of Temprite carbonators and discussed the Temprite instantaneous coolers and oil separators. Next, H. W. Small of Thermal Co. Inc., addressed the meeting on the subject, "Don't Damn the Expansion Valve; It Put You in Business." Mr. Small discussed the operation and application of expansion valves in general and answered many questions asked of him.

A banquet attended by 51 people, was held the evening of May 15th, after which J. L. Goodson of Ultra-Violet Products Co. of Los Angeles, gave a demonstrated talk on germicidal lamps and their use in refrigerated areas with side lights on "Life Lite" for Pharmaceutical purposes and "Mineral-Lite" for use in metallurgy and crime detection. Following this the meeting adjourned until Sunday, May 16.

On Sunday morning, the first order of business was the decision to hold state meetings twice each year—in April and September. Election of State Officers then took place with the following results: W. L. Piehl, *President;* Tom Young, *Vice-President;* Norman Sulenes. *Secretary;* and W. W. Brown, *Treasurer.* At 2:00 P.M., Don Thorpe and Lew Hertel of Linde Air Products demonstrated the uses of acetylene in refrigeration work and told of the precautions that should be taken in handling Prest-O-Lite.

The Montana State Association expects to hold its next meeting in Butte in September of this year.

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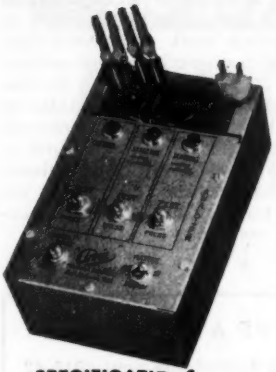
SECOND DETROIT MEETING

FIFTY-TWO members and guests turned out for the second meeting of the Greater Detroit chapter Tuesday, June 15, despite the counter-attraction of Detroit's first big league night baseball game to hear H. T. McDermott, international secretary, outline the objectives and educational plans of the society.

James Perry, a director of the National Association of Refrigeration Contractors, pledged support of that organization in the formation of the Detroit RSES, and Ed Kellie, temporary chairman, described the general business outlook, urging members to keep up inventories in view of the probable shortages to develop within a year as a result of our stepped-up rearmament program.

The meeting was concluded with a question-and-answer period conducted by Charles Earl, educational chairman.

MORE PROFIT—LESS TIME



ANALYZE HERMETICS WITHOUT GUESSWORK

Let Annie Do It!

HERE IS A HERMETIC UNIT ANALYZER which, in a matter of seconds, will positively indicate the nature of any electrical defect.

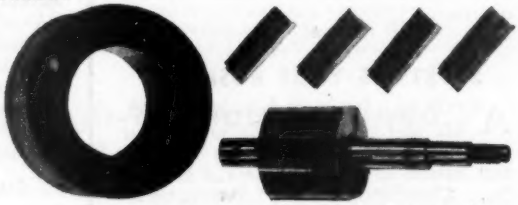
SPECIFICATIONS
Size: 3" x 5" x 8"
Weight: 1¾ pounds
Price: **$16.50**

Annie

- REVERSES DIRECTION OF RUN
- PROVIDES MANUAL STARTING
- INDICATES OPEN OR GROUNDED FIELDS
- RELEASES STUCK OR FROZEN UNITS— Stuck units can frequently be freed by reversing the running direction.

ACCURATE—you can estimate closely without fear of having to take a loss
A "must" in any repair kit. Be sure you have it. Don't be embarrassed by your customer asking: "How do you know?"

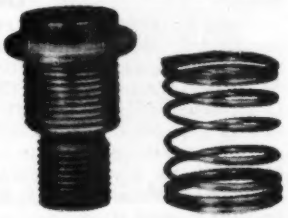
COLDSPOT
Replacement Compressor Parts



For All Compressors Having 15/32 Shafts

Matched Set Each **$14.50** Lots of 3, each **$13.80**

BELLOWS SEAL



"Quiet" CARBON VANES

Each	$1.25	Each	$3.00
Lots of 10 Sets, Each	$1.19	Lots of 10	$2.85

MECHANICAL ENTERPRISES DEPARTMENT 36

4856 LANKERSHIM BLVD. NORTH HOLLYWOOD, CALIF.

SURVEY OF VOCATIONAL SCHOOLS

THROUGH the International Educational and Examining Board, a survey of vocational schools teaching refrigeration will be made in the near future. A. E. Doan, R.R. No. 2, Weston, Ontario, Canada, a member of the International Educational Board, will head the committee to secure this information.

Prompted by numerous requests from its members and others, the committee will endeavor to secure such pertinent information as will serve as a guide to those considering the facilities of the available schools.

When completed, the results of the survey will be compiled and made available to those members interested in this information.

In keeping with the established policy of the Society, no recommendation of any specific schools will be included—only such factual information being given as will provide the reader with data from which an intelligent selection can be made to meet individual requirements.

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SAFETY IS YOUR BUSINESS

ACTUATED by a desire to protect life and limb, not only among our own membership, but for the industry and nation as a whole, George Schuld, Sr., Cleveland, Ohio, International Chairman of the RSES Safety Committee is anxious to secure the cooperation and assistance of every chapter and member-at-large in this important activity.

Every accident in which refrigeration equipment or personnel is involved should be reported to George Schuld, Sr., 4596 Warner Road, Cleveland 5, Ohio, oftentimes the report is covered in a newspaper story and in those cases a clipping will provide the information. If you have personal knowledge that supplements the printed information, be sure to send it along.

Safety measures should be frequently discussed in chapter meetings. A local chapter chairman designated as the "Safety Chairman" should head a standing committee to correlate the activities of the chapters with those of the International Committee.

Mr. Schuld, who is currently International Safety Chairman, also serves in the same capacity as Chairman of the Buckeye Association and Cleveland Chapter. He has spent many years in promoting safety work and accumulating information on accident prevention.

Available at the present time for the use of chapters is a recorded talk on safety by the International Chairman and shortly a bulletin will be issued to each member, to be followed by others. Mr. Schuld has promised that every effort will be made to make RSES members "safety conscious."

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DON'T BE A DELINQUENT

JULY 1st started the new 1948-49 fiscal year. If you have not already done so, send your remittance to your local chapter secretary, if you are a member of a chapter.

MEMBERS - AT - LARGE should remit promptly to the International Secretary's office.

Avoid missing any releases from the International Society by promptly paying your dues. Oftentimes a delay in remitting may make it impossible to supply back issues of educational material issued to the membership.

Don't be a delinquent!

NEW SECTIONS FOR "ALL MAKES SERVICE MANUAL" ON WAY

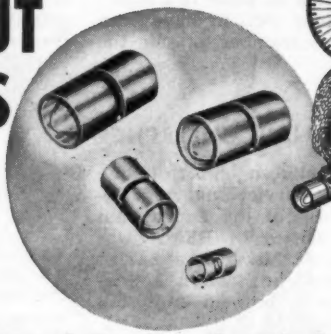
TWO new sections for the RSES "All Makes Service Manual" are being released by the International Educational and Examining Board to members of the Society.

The first bulletin on "Reverse Cycle Refrigeration" which is numbered Section 26, was mailed to the membership in early July. It is a bulletin of 12 pages containing much valuable data in tabulated form, prepared in understandable manner.

Now in the printer's hands is Section 33, "Refrigeration of Fresh Meats," by John Spence, Service Manager of Hussmann Refrigeration, Inc., St. Louis, Mo.

Genuine Joe's the guy who knows

ALL ABOUT BEARINGS



Tests prove Steel-Backed, High-Tin, Babbitt-Lined Bearings *Superior!*

Pioneered by Wagner in 1927, steel-backed, high-tin, babbitt-lined bearings have proved superior both in laboratory tests and field performance. These steel-backed, high-tin, babbitt-lined bearings of prewar quality have been furnished for the past year. They withstand heavy pressure, resist seizure and shaft scoring and operate at low temperatures. That's why Wagner uses them exclusively in their famous fractional horsepower and smaller integral horsepower sleeve-bearing motors (203-505 frames).

Steel-Backed, High-Tin, Babbitt-Lined Bearings Come *Ready to Install...*

Wagner steel-backed, high-tin, babbitt-lined bearings come to you diamond-bored to a specific size—simply press in (*don't beat in*—this causes buckling and upsetting of end of bearing) and reassemble the motor. It is ready to run.

They are also available unbored for use on undersized shafts so that they can be line reamed to the desired size.

GET THEM WHERE YOU SEE THESE SIGNS

identifying the 450 Authorized Service Stations or Parts Distributors for Wagner Motor Replacement Parts. They are available for immediate delivery.

Write for **CATALOG MU-40**

Every repair shop needs one. It helps determine the catalog number and price of Wagner Motor Parts.

6433 PLYMOUTH AVENUE
ST. LOUIS 14, MO., U. S. A.

M548-3

ELECTRICAL AND AUTOMOTIVE PRODUCTS

This section covers the application of refrigeration at the meat retailer's level. It is a thorough expose of the optimum conditions to strive for in the installation of new equipment and rehabilitation of existing equipment.

With the addition of these two bulletins, a total of four sections have been distributed to the membership for the manual.

★ ★ ★

BOSTON REGIONAL CONFERENCE

A MEETING between officers of the Refrigeration Service Engineers Society and members of the Educational Conference Committee of REMA was held at Swampscott, Mass., on June 3rd to make plans for the Eastern Educational Conference to be held in Boston on October 8, 9 and 10.

The meeting was attended by A. W. Andreen, president of the New England Assn. of RSES; James A. McCue, president of the Boston Chapter; John J. Madden, Educational Director of the New England RSES and Charles C. Harris, 1st Vice President of RSES International. Hermann Spoehrer, K. B. Thorndike and George Mills represented REMA.

Plans are now well under way and promise an excellent program, exhibits and entertainment which should draw 3,000 visitors. Two ballrooms in the Bradford Hotel will be used providing 85 exhibit booths with no interference from posts or pillars.

Tentative program as set up on June 3rd is as follows:

Friday, October 8

Exhibits open from 2 p.m. to 10 p.m.
Educational briefs 7 p.m. to 9:30 p.m.

Saturday, October 9

Round Table Forum 9:30-10:30 a.m.
Speaker 10.30.
Speaker 11:30.
Exhibits open from Noon to 10 p.m.
Educational briefs 2 to 5:30 p.m.
Educational briefs 7 to 9:30 p.m.

Sunday, October 10

Exhibits open 10 a.m. to 3 p.m.
Round Table Forum 9:30-10:30 a.m.
Educational briefs 10 a.m.-1:30 p.m.
Banquet 3 p.m. to 6 p.m.

Folder containing full information on exhibit space, is now in preparation and will soon be mailed to all exhibitors of the 5th All Industry Show together with rules and regulations.

It is believed that the Eastern Educational Conference at Boston will be well attended and surpass the San Francisco conference in number of exhibits.

The speaking program is now being set up and will be released soon, together with more complete details.

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NEW UNIFORM EMBLEM AVAILABLE

RECENTLY added to material available to the membership, is an attractive embroidered emblem three inches in diameter for attaching to work shirts and uniforms.

The emblem, embroidered in black on a green background, is a replica of the Society's insignia, the center portion containing the letters RSES in script; the outer edge the name of the society

and the word "member" at the bottom.

The emblems can be secured from the International Secretary's office at a cost of fifty cents each. Emblems are available to associate, active and certificate members.

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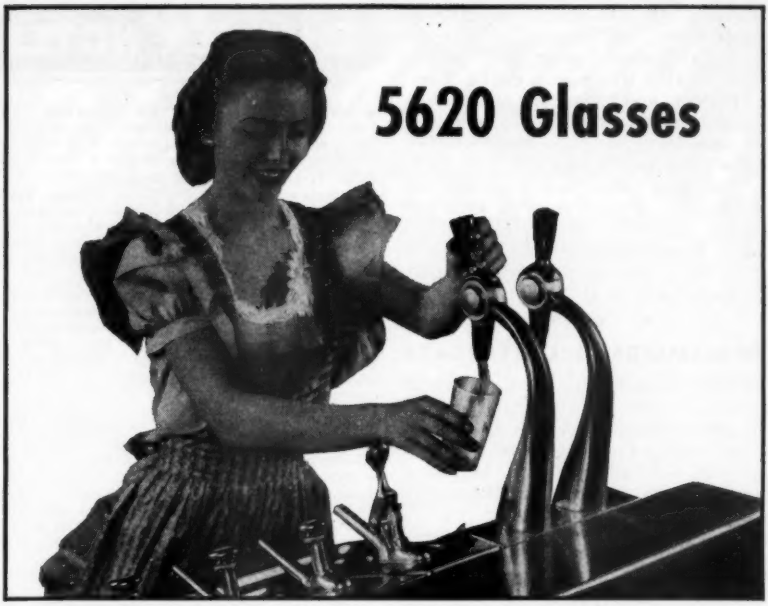
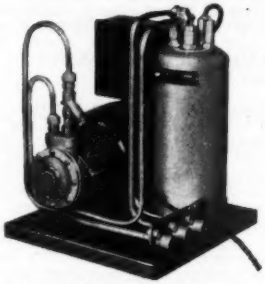
CHICAGO CHAPTER PICNIC

EVERYONE had fun at the Chicago Chapter's picnic held Sunday, June 13. The main attraction was a softball game between the wholesalers and the servicemen. Score? 22 to 10 in favor of the servicemen! The northside team



New TEMPRITE CARBONATOR
achieves peak operating efficiency



MODEL CB-305 Temprite Packaged Carbonator is applied to existing cooling systems. Combination cooler-carbonator also available. Write for bulletins.

1. User gets up to 5620 glasses of highly carbonated water from a single tank of CO_2 gas. This is equal to 281 glasses per pound of CO_2 gas used.
2. No loss of CO_2 gas through purging or venting.
3. Offers completely automatic carbonation for use in soda fountains, taverns, coin operated beverage dispensing machines, etc.
4. Operates independently of city water pressure.
5. Complete assembly, ready to install and mounted on a rigid steel base, includes pump and motor. Measures only 13" x 16". Fits in practically any location.
6. Stainless steel, long-life construction.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous 80° 40° *Liquid Cooling Devices*

45 PIQUETTE AVENUE DETROIT 2, MICHIGAN

also played the southside team—the northside being the victors by a score of 21 to 20. Umpires were Earl Lester and Pat Doyle. Races and contests for both children and grownups were held in the afternoon. Floyd Lilley won the gunny sack race, and Mrs. Joseph Barys took the prize for the egg carrying contest. The door prize was a socket set worth $28.00. This was won by Paul Riccio.

International Secretary H. T. McDermott attended the picnic. Another distinguished visitor was George Peyton.

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NEW MEMBERSHIP CERTIFICATE

STARTING with the 1948-49 fiscal year, a new form of membership certificate is being issued by the International Society to its members. The new certificate will serve for a ten year period and each year a small sticker will

1948 1949
Membership Certificate
1933 1934
1949 1950
1934 1935
1950 1951
is a member in good standing as of the date indicated, of the
1935 1936
Refrigeration Service Engineers Society
1951 1952
a non-profit Educational Association to further the advancement of its members in the Art and Science of Refrigeration Installation and Service
1936 1937
1952 1953
Admitted:
1937 1938

The new certificate to be issued this year.

be furnished with the annual membership card, to be affixed in the designated place indicated on the certificate.

Members affiliated with the Society for ten or more years are designated by a gold seal. The date of the member's admittance to the Society is also shown.

The society emblem appearing in the center of the certificate is red. The yearly stickers are in silver and the ten year sticker in gold, all of which adds considerably more color to the certificate.

The International Society recommends the certificate be suitably framed so that it may be carefully preserved.

The certificate will indicate the class of membership—namely, Associate, Active or Certificate.

CHAPTER NOTES

• ARROWHEAD CHAPTER, **Riverside, Calif., June 14**—The following officers were elected to serve for the fiscal year 1948-49: **E. J. Gilmore, President; Charles Edwards, 1st Vice-President; Wm. H. Bird, 2nd Vice-President; P. B. Montgomery, Secretary; C. H. Ricker, Treasurer; George Pantzer, Sergeant-at-Arms;** and **F. A. Frazer, Educational Director.** Board of Directors-Herbert Kaeding, Dave Crawford, Les Crawford, Paul Rice and Frank Parker. The retiring officers were given a vote of thanks for their good work during the past year. With the consent of the members, the educational program was dispensed with due to the lateness of the hour. The Valley Refrigeration Supply of San Bernardino, donated a new style tubing cutter for the Dutch auction.

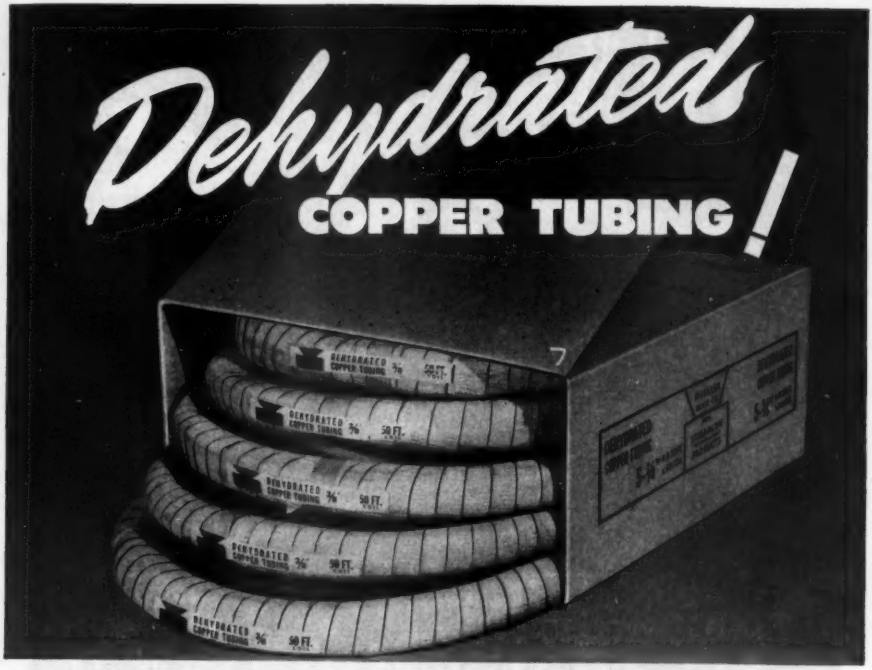
• BERKSHIRE COUNTY CHAPTER, **Pittsfield, Mass., May 26**—During the business meeting, Elmer Baldwin discussed a forthcoming tube bending contest to be held in Boston. The educational program consisted of a talk on the construction and application of thermo switches, given by Arthur Halmeyer of Ranco, Inc.

• BIRMINGHAM CHAPTER, **Birmingham, Ala., June 16**—this was a special meeting called for the purpose of installing the new officers who are Floyd Corbin, **President;** James Foley, **Vice-President;** E. V. Oakwood, **Secretary;** W. V. Peek, **Treasurer;** Ed. Lovvorn, **Sergeant-at-Arms;** and Wm. Butler, **Educational Director.** Board of Directors—R. W. Dial, Doyle Sessions and George Tribble. As a compliment to R. W. Dial of Anniston, Ala., one of the chapter's most faithful out-of-town members, the meeting was held in his city. An excellent dinner was served, and Mr. Dial proved himself to be an exceptional host.

• BLACKHAWK CHAPTER, **Burlington, Iowa, June 7**—A vacancy existed for the office of Secretary-Treasurer, and by unanimous vote Max Marsden was elected to fill it. Herb Lohman was elected to the office of Sergeant-at-Arms. A state delegate was also elected, and Roy Lanz was chosen for this. The President then appointed an Entertainment and Refreshments Committee with A. C. Johnson as Chairman. The Educational Committee Chairman introduced Robert Rowland, C. A. Dickinson and Paul Domke of Mueller Brass Co. Mr. Domke gave a talk which was both interesting and educational, after which an open discussion was held.

• CANTON REGIONAL CHAPTER, **Canton, Ohio, May 18**—This was a combination dinner and business meeting, with 30 in attendance. On the educational program, Brooks Frantz introduced Al Nucum, a representative of Automatic Products Company of Milwaukee, who showed slides and cutaway samples of his company's products.

The June 15th meeting was held in the conference room of the Ohio Public Service Co.



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★ 1/8 THRU 1/4 .030 WALL ★ 5/16 THRU 1/2 .032 WALL ★ 5/8 THRU 3/4 .035 WALL
50 FT. LENGTHS

Mueller Brass Co. Dehydrated Copper Tube Coils are now being cartoned as an added precaution against damage and to facilitate greater ease in handling and stocking.

Within the carton, each coil is carefully wrapped and labeled for your convenience. Our Dehydrated Copper Tubing is consistently bright, clean and as dry as is humanly possible to make it. It is uniformly annealed dead soft so that it can be easily formed, bent or flared without danger of fracture.

ORDER FROM YOUR WHOLESALER

MUELLER BRASS CO.
PORT HURON, MICHIGAN

BEEHIVE HOLDS ANNUAL PARTY

Beehive Chapter, Salt Lake City, celebrated its annual party and dance on April 23 at the Art Barn with a good attendance present for the festive affair. Good entertainment kept the party in high spirits. James F. Craner, president of the chapter, introduced International Educational Chairman Paul Reed, Milwaukee, and Director J. L. Driskell, Burley, Idaho, as visiting guests.

in Massillon. After chapter business was taken care of, George Ullum from the Airserco Company, Pittsburgh, showed a movie on the subject of checking the electrical system. He also showed slides of constant pressure valves, snap action valves and check valves.

• CENTRAL NEW YORK CHAPTER, Syracuse, N. Y., June 10—A fine educational program was arranged for this meeting. After a talk by David Rosenthal, manager of Frigidaire's service department, he introduced R. L. Teigler, Eastern District Manager of Frigidaire, who spoke briefly and promised a more technical talk at a future meeting. The next part of the program was two films, one of which was in technicolor, showing the proper preparation of foods for freezing. After this, refreshments were served.

• CENTRAL PENNSYLVANIA CHAPTER, Harrisburg, Pa., June 17—Mr. Paul Domke of Mueller Brass Co. was to have conducted a soldering demonstration and contest at this meeting but was prevented from doing so because of the death of his mother. Mr. House and Mr. Wagner of the same company substituted for Mr. Domke but the soldering contest had to be postponed until a later date. Election of officers resulted in the following: A. LeFevre, President; H. J. Stock, 1st Vice-President; S. Rogers, 2nd Vice-President; J. L. Butler, Secretary; A. D. Wynn, Treasurer; and R. Sage, Sergeant-at-Arms.

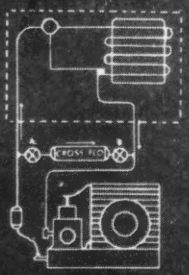
NO MORE FREEZE-UPS WITH 'Cross-Flo' DRIER-FILTER

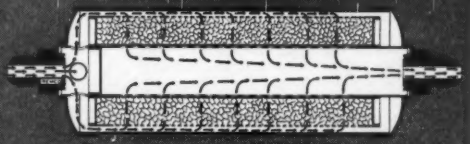
installed in the by-pass between the liquid & suction lines.

That's the enthusiastic report of M. R. Pielstick (Pielstick Refrig'n Service Buhl, Idaho) after he installed his first Cross-Flo (bought from his wholesaler N. O. Nelson Co. of Salt Lake City).

Mr. Pielstick found the answer to a problem that had been bothersome for months—using several other types of driers, he had been unable to get the moisture down to where it wouldn't freeze up. Then he installed a Cross-Flo in a lower temperature location (see diagram below) where the drying efficiency of silica gel was so greatly increased that service troubles from expansion valve freeze-ups were entirely eliminated. Now he's an enthusiastic and *exclusive* Cross-Flo user.

Diagram below shows Cross-Flo's principle of flowing the refrigerant uniformly through the outside course-filter then slowly across the large cylindrical bed of drying agent, finally flowing slowly through the extra-large highly-efficient filter.





REMCO HEAVY-DUTY
'Cross-Flo' DRIER-FILTERS

—CAPACITIES—

LIQUID LINE: ¼ to 7½ HP
LOWSIDE: ¼ to 15 tons Freon-12
SUCTION LINE: ⅜" to ⅞" O.D.

Send for Circular 711-A for 'all the facts' about temperature effect on drier performance.

REMCO
INCORPORATED
ZELIENOPLE, PENNSYLVANIA

Carried in stock by leading wholesalers everywhere

• CORPUS CHRISTI CHAPTER. **Corpus Christi, Texas, June 22**—An educational program in two parts, one "Creating Good Will" and the other, "Commercial Service" were presented. These were furnished by Frigidaire, through the courtesy of E. B. Parsons of Straus Frank Co. in San Antonio. They were run on a machine furnished by Pete Murray, Frigidaire dealer, and operated by B. W. Johnson. These talks, with the slides, were very interesting and instructive. Nineteen members and one visitor attended.

• DAYTON CHAPTER, **Dayton, Ohio, June 10**—After the business session, the meeting was turned over to John Becker who presented K. M. Newcum of Remco, Inc. Mr. Newcum gave an exceptionally fine talk on driers and drier applications.

• DISTRICT OF COLUMBIA CHAPTER, **Washington, D. C., June 10**—Approximately 60 members and guests were in attendance at this meeting. A brief business meeting was held during which R. S. Pollock was elected Sergeant-at-Arms to succeed J. L. Doggett who found it necessary to resign. Four new members—R. T. Hare, M. J. Trautman, J. E. Porter and W. T. Geoghegan were presented with membership certificates. The door prize was a flashlight and hi-lo pressure control donated by Nash-Kelvinator Sales Corp., and won by President Helms. The feature of the evening was an excellent talk entitled "Liquid Cooling" given by J. W. Archibald, Eastern representative for the Temprite Products Co. of Detroit. Mr. Archibald discussed his company's products—including liquid cooling devices, carbonates, oil separators, back pressure regulators and accessories in a way which suggests he is complete master of his field. His talk was well received and appreciated by the chapter. Refreshments were enjoyed by all following the meeting. Attendance was approximately 50.

• ELM CITY CHAPTER, **New Haven, Conn., June 2**—The following officers were elected for the new fiscal year: Tom B. Howell, **President**; Frank J. Moran, **1st Vice President**; Joe Gancarz, **2nd Vice-President**; Lee Wallace, **Secretary**; Al Blomberg, **Treasurer**; and Rex Barnes, **Sergeant-at-Arms**. Ned Morley announced that the annual picnic would be held at Fisherman's Nook on August 22. An interesting and instructive demonstration of the Thermobank was given by Ray Graham and Martin Hillary.

• FAIRFIELD COUNTY CHAPTER, **Fairfield County, Conn., June 14**—Honorary guests at this meeting were Mr. & Mrs. Charles Harris and Mr. & Mrs. Arthur Andreen. New Officers were elected for 1948-49 with the following results. Earl Walter, **President**; Edward Vogel, **1st Vice-President**; Daniel Robinson, **2nd Vice-President**, William S. Pekar, **Secretary-Treasurer**; Frederick Freer, **Sergeant-at-Arms**; and Lou Henriksen, **Educational Chairman.**

• FLORIDA WEST COAST CHAPTER, **Tampa, Fla., May 13**—Election of officers took place at this meeting. New officers are W. A. Bingham, Sr., **President**; A. B. Haverstock, Sr., **1st Vice-President**; G. H. Mitchell, **2nd Vice-President**; S. F. Graziano, **Secretary**; H. M. Carryl, **Treasurer**; and Joe D. Stephens, **Sergeant-at-Arms.** Nomination of the Educational Chairman was postponed until the next meeting. James R. Berryman was elected to the Board of Directors. On the educational program, W. A. Bingham, Jr. displayed and demonstrated instruments used in checking air conditioning jobs.

At the June 10th meeting, A. R. Pool was elected Educational Chairman. Following a brief talk and discussion on refrigerant gases, their characteristics and specific heats, several short motion pictures were shown.

• FORT WAYNE CHAPTER, **Fort Wayne, Ind., June 14**—There were 45 present who signed the register. Norman Englebrecht was elected delegate, and O. E. Hollenberg elected alternate to the state meeting. Delegates to the state convention are Wayne Coker and C. L. Ripley. The program presented by Educational Chairman Gildea included a Mueller Brass Co. representative who showed and explained the use of driers and their application, check valves, heat exchangers, solder fittings, etc. He also demonstrated soldering —showing how it should be done and how to avoid many of the troubles that commonly appear.

• GREENVILLE CHAPTER, **Greenville, S. C., June 9**—After chapter business had been completed, the following officers were elected to hold office from June, 1948 until June, 1949: W. C. Lindley, **President**, Wayne West, **1st Vice-President**; T. L. McCauley, **2nd Vice-President**, W. N. King, **Secretary-Treasurer**; and Pat C. Scroggs, **Sergeant-at-Arms.**

• HEAD OF THE LAKES CHAPTER, **Duluth, Minn., June 8**—The business session was brief and following it an open discussion on moisture and driers took place. The meeting was conducted by Secretary and Treasurer Ely in the absence of the president. The 1st vice-president, 2nd, vice-president and sergeant-at-arms were also absent.

• INDIANAPOLIS CHAPTER, **Indianapolis, Ind., May 11**—Messrs. Halsey and Krasaur of Universal Cooler Corp. were present to give a talk and demonstration of their units and discuss Universal's service policy.

At the May 25th meeting it was voted to hold one meeting a month during July and August. The speaker of the evening was Mr. Peyton of the Sterile Lamp Co. who gave a very good talk on the values of these lamps when used with refrigeration and showed sound pictures demonstrating the action of the rays from these lamps. This proved very educational.

The June 8th meeting was devoted mainly to business. The chapter's annual picnic to be held in August was discussed at length and a number of picnic committees were appointed.

• KANKAKEE VALLEY CHAPTER, **Kankakee, Ill., June 1**—Ed. Riccio of Chicago was a guest at this meeting. An open discussion on the city code occupied some time during the business session. The educational program planned for the evening did not take place due to the absence of the principal speaker.

APPLIANCE TESTER

A genuine instrument for men doing refrigeration maintenance work, trouble shooting, or general field service.

So small and compact it can be carried in your pocket.

CHECK ITS MANY USES

- ★ Manual Test Relay for Refrigerator Motors.
- ★ Continuity Tester for Motor Windings.
- ★ Ground Testing for Motors and Wiring.
- ★ Makes Quick and Simple Hook-up for Reversing Hermetic Motors to Free Stuck Units.
- ★ Test Cord for Any Appliance.
- ★ Capacitor Tester.
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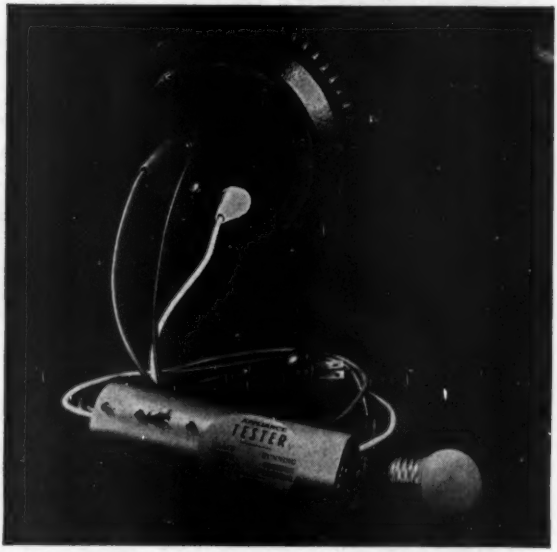

The tester is shown here with heavy guarded clips attached to a hermetic unit.

Versatility - Capability - Service

AN INSTRUMENT YOU CAN DEPEND UPON!

A simple, practical instruction sheet, which includes color charts for the most popular hermetics, is furnished with each tester.

Price: $7.50 (Less bulb & fuse)—Order from your wholesaler or write to

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P. O. BOX 3386 **W. AKRON STATION, AKRON, OHIO**

• LITTLE EGYPT CHAPTER, **Benton, Ill., June 2**—A nice attendance of 34 members and 24 guests were present to hear the speaker of the evening, "Red" Hart give a fine talk on Detroit valves, using slides and a recorder to demonstrate. Introduced by Mr. Reese were Joe Cavetalo, president of the Illinois Electric Works of East St. Louis, Ill., who sponsored the meeting, Elmer Lask, the vice-president, Rudy Serth, sales manager, Bob Burns, store manager, and Don Stock. The refreshments served were furnished by the Illinois Electric Works.

The two "celebrities" pictured here will be recognized as (left) Governor Earl Warren of California, Republican nominee for Vice-President, and (right) H. T. McDermott, International Secretary of R.S.E.S.

The latter, we expect will be surprised to see himself pictured thus.

• MIAMI CHAPTER, **Miami, Fla., June 9**—Mr. Manley, President of the Alabama State Chapter, spoke in behalf of organizing a South Eastern Association. It was Mr. Manly's opinion that through such an organization better educational programs could be secured for member chapters. Frank McNellis of the Imperial Brass Company, and a chapter member, conducted a tube bending contest sponsored by his company. J. Turpin was the winner, with P. E. Richie, A. Vann and T. Thomson finishing in that order. Officers elected for the 1948-49 term include O. W. Brown, **President**; J. Dolard, **1st Vice-President**; E. Buyama, **2nd Vice-President**;; C. Sturgis, **Secretary-Treasurer**; and W.W. Kelly, **Sergeant-at-Arms**. Board of Directors—J. Nall, A. Runyon, J. Harris, J. Turpin, T. Linares, H. Wright and M. Comfort.

• MONUMENTAL CHAPTER, **Baltimore, Md., June 11**—After business was completed, the meeting was turned over to Mr. Ecklof who introduced the speaker of the evening, Mr. Scott. An interesting talk was delivered by Mr. Scott on the subject of driers. Refreshments followed.

• ONTARIO MAPLE LEAF CHAPTER, **Toronto, Ont., June 3**—The meeting was held in the Auditorium of Frigidaire Corp. in Leaside. After an intermission during which time the meeting adjourned to the cafeteria for refreshments, the President called on W. J. Marshall and H. Donnell to present the questions and answers covering the certificate examination. This proved to be a very interesting part of the program and a considerable amount of information was gained **RSE M5 June 9 Lemmer 6x on 7 14 m's** ..... by this method of conducting the questions and answers, it being left up to the members to answer the questions as given by H. Donnell before the official answer was stated by W. J. Marshall. After the meeting, the President called for a hearty vote of thanks to Frigidaire Corporation for the use of their Auditorium and for the refreshments.

• PEACH CHAPTER, **Macon, Ga., May 3**—Applications for membership were received for James M. Scarborough and W. E. Norton. A discussion was held among all members on whether the liquid indicator should be placed before or after the drier and whether the liquid indicator should be horizontal or vertical.

• PROVIDENCE CHAPTER, **Providence, R. I., June 2**—During the business meeting, officers were elected for the 1948-49 term as follows: Frank Vieira, **President**; Albert Verrechia, **Vice-President**; William Remington, **Recording Secretary**; Louis Collamati, **Financial Secretary**; Maynard N. Spidell, **Treasurer**; George R. Williams, **Sergeant-at-Arms**. The President appointed an Educational Committee with Hallam Richardson as Chairman, and a Refreshment and Entertainment Committee with Albert Verrechia as Chairman. The speaker of the evening, Art Javes of Sporlan Valve Co., gave a talk on all types of automatic and thermostatic expansion valves. Due to circumstances beyond his control, the demonstration equipment was not available and he confined his talk to a brief summary and question and answer period, promising to return in the Fall with his demonstration and movies.

• SAN DIEGO CHAPTER, **San Diego, Calif., May**—Now that the California State Convention was proven a huge success, things are back to normal in the southwest corner. At the May meeting, two interesting lectures were presented to the chapter. The Kramer Trenton Company sent two of its representatives to demonstrate the automatic defroster. This proved very interesting to the members who always enjoy a practical demonstration. The Sporlan Valve Company also gave a

Manual Flushing OF PENN WATER VALVES ... is easy!

Just slip a screw driver under the range spring and lift to release the tension. That's all you do to flush and clear the valve seat of foreign matter which may accumulate, especially in new installations. Here's another big advantage of Penn water valves which are protected from corrosion and sediment because water can't come in contact with the range spring or sliding parts.

Built in threaded and flanged styles, in a wide range of sizes. See your wholesaler or write for bulletin R-1986-B, giving complete details.

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AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

DOMESTIC ELECTRIC REFRIGERATORS

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IMMEDIATE DELIVERY FROM SPECIAL EXPORT RESERVATION STOCK

Model

D31—3.3 cu. ft. £60. C.I.F. any port in the world. Designed for tropical use.

D66—6.6 cu. ft. £80 C.I.F. any port in the world. Designed for tropical use.

D8—8 cu. ft. £70. C.I.F. any port in the world.

Details of Commercial and other refrigeration equipment upon request.

Special terms to Bulk Buyers.

Write at once to
LONGFORD ENGINEERING CO. LTD.,
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Bognor Regis, Sussex, England.

Telephone 2201 (10 lines)
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visual aid discussion of their products, with some interesting side-line photos.

The chapter also celebrated its 10th annual dinner dance at the Continental Room of the San Diego Hotel. This is an affair which has proven very popular and all members and their wives participated. The chapter was also honored by the presence of the California State Association President, Pat Riley.

At the June meeting, films from the San Diego Gas & Electric Co. were shown by Dan Turner. The topic, "By Jupiter." The chapter was very sorry to lose its vice-president, George Coombs, who due to business reasons found it necessary to resign from active participation.

• SOUTHERN TIER CHAPTER, Elmira, N. Y., June 17—Mr. Eves of Linde Air Products was present to give a demonstration on welding. This was highly interesting to the members and it was decided to send Linde Products a letter thanking them for their cooperation. Mr. Eves was assisted by Mr. MacKensie.

• SPINGFIELD CHAPTER, Springfield, Mo., June 16—Harry Hoffman, Chairman of the Educational Committee introduced John Spence from the Hussmann Refrigeration Company of St. Louis, for the educational part of the program. He showed a picture and slides, and delivered a lecture on the servicing of open type refrigeration equipment. After the educational program, election of officers for the next year was held, and the following persons were elected to serve for the year ending June 30, 1949: J. C. Titus, President; M. F. Champieux, 1st Vice-President; O. A. Weckherlin, 2nd Vice-President; Wayne Moore, Secretary; M. L. Mercer, Treasurer; Leonard J. Roetto, Sergeant-at-Arms; and Harry Hoffman, Educational Committee Chairman.

• TRI-COUNTY CHAPTER, Joliet, Ill., May 15—The meeting started off with a tour through the Rialto Theatre to inspect their air conditioning system. An engineer conducted the tour and answered many questions. Back at the Woodruff Hotel, where the meeting was held, Harold Anderson gave a talk on the Psychrometric Chart and each member was given a chart to make out. It was decided that Dick Marquis arrange for a debate on open and closed condensing units to be held at a future meeting. It was also voted to limit the business meetings to one

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PENO ROBISON
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For men who want to know more about

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Write for free booklet and class starting dates

Detroit Air Conditioning Institute
4125 Grand River Detroit 8, Mich.

IT'S NEW!!

IT'S IMPROVED!!

IT'S A TIME SAVER!!

Part No. C3 **$1.95**

Pat. Pend.

WATSCO

REPLACEMENT CHECK VALVE

For Cold Spot & Bohn Units

A boon to refrigeration repairmen. Wagner Tool & Supply Corp., of Long Island City, N. Y., Manufacturers of "WATSCO" products, announces a newly improved replacement check valve for Coldspot and Bohn direct drive units.

The check valve assembly is completely self contained in an all brass housing that has an extended portion ½ inch long by .3155 diameter, this is driven into the 5/16" opening of the original check valve seat, thus forming a pressed fit.

This cartridge type of construction offers a number of decided advantages — eliminates the need of lapping or grinding — can be quickly installed or removed through the upper part of the unit — tested and calibrated at the factory — the only tool required is a standard threaded 5/16" bolt.

If your wholesaler cannot supply you, order direct from us.

Write for Our Free Descriptive Circular

other Watsco products:

- **TERMINALS**
- **FLAPPERS**
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- **TOOLS, ETC.**

SPEED REPAIRS AND REDUCE COSTS WITH WATSCO

Wagner

TOOL and SUPPLY CORP.

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hour so that more time might be devoted to the educational programs.

• WESTERN MASSACHUSETTS CHAPTER, **Springfield, Mass., June 8**—The 34 members in attendance at this meeting saw a demonstration given by William J. Miklejohn of the McIntire Connector Co., of the new method of drying out systems that contain water. In addition, a film was shown, "Clean Water" by the General Electric Co., giving the facts on the pollution of streams and bodies of water and the remedy.

On June 22nd, two representatives of the Linde Air Products Co. supplied the educational program with a demonstration on soldering, cutting, welding and brazing methods. W. G. Reece was the demonstrator and Mr. Hagan, sales engineer, was present to assist him.

• WHALING CITY CHAPTER, **New Bedford, Mass., May 20**—The meeting was turned over to Arthur Belliveau, Chairman of the Educational Committee, who introduced Sidney Shapiro of Tenney Engineering, Inc., the guest speaker of the evening. Mr. Shapiro's subject was "Tenney Thermostatic Expansion Valve and the Tenney Automatic Defrostolator." After the talk there was a question and answer period. Forty members attended this meeting.

On June 3rd, five new members were accepted into the chapter. Contestants from the chapter for the tube bending contest to be held in Boston are: Frank S. Folger, Richard Evans, George Ratcliffe and Alexander Pelletier. Door prizes for this meeting were donated by Mr. Richardson of Rhode Island Supply of Providence, R. I. Ralph King won a Taylor pocket thermometer; Emile Berube, a 5 lb. refrigerant drum; and Joseph McCandless, a Weatherhead dehydrator.

• WORCESTER CHAPTER, **Worcester, Mass., June 15**—At this meeting, International 1st Vice-President Charles C. E. Harris and International Director Wm. Tierney installed the following chapter officers: Wilrose Hanson, **President;** Harry Manchester, **1st Vice-President;** Francis Turner, **2nd Vice-President;** James M. Stevenson, **Secretary-Treasurer,** Anthony Jakstis, **Sergeant-at-Arms;** and Marshall Lewis, **Educational Committee Chairman.** Board of Directors—Francis Foley, Samuel Gaffin and Claude Ide.

LADIES AUXILIARY

• CANTON CARDINAL AUXILIARY, **Canton, Ohio, May 21**—Mrs. Beaber, a new member, was introduced to the members at this meeting. A hat contest will be held in the near future. The entrance fee for each hat will be 50c and the winner will receive a prize. A motion was made and carried that this auxiliary start a project to help needy families in Germany. Upon completion of other business matters, refreshments were served.

• KANSAS CITY AUXILIARY, **Kansas City, Mo., June 17**—A raffle was held for a large crochet and ribbon pin cushion donated by Pauline Lambert. It was won by Addie Stodgell. Susanna McCullough conducted the games. A pyrex pie plate was won by Wilma Smith for the penny game, and plastic bowl covers for winning the states quiz went to Edna Visger. Susanna McCullough and Wilma Smith baked cookies which they served with coffee to approximately 30.

★ ★ ★

TAILOR THE INSTALLATION

(Continued from page 37)

necessary, to slaughter and handle the largest beef without additional help.

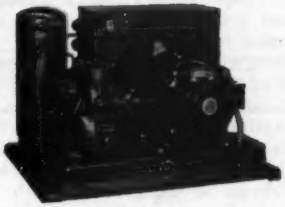
In regard to the future of the refrigeration and air conditioning business, Mr. Luttrell is very enthusiastic. "We are facing a future," he says, "that is almost incomprehensible. A great many new needs have been discovered involving refrigeration and air conditioning, such as manufacture of metals, in surgery, in medicine and many other lines. In these, we haven't even scratched the surface.

"I believe that within the next two or three years the sale of air conditioning equipment will be limited only by the available supply. Air conditioning is no longer a luxury but a definite necessity. It is a surprising fact that many manufacturers are planning and some are already installing air conditioning in their production departments solely for the benefit of their production employes. This has come about in large measure because these manufacturers first tried air conditioning in their offices for their own comfort. Hardly daring to install it exclusively in their private offices, they put it in their general offices as well and found a great increase in efficiency from their office help because of it. Instead of a luxury, they found it to be a good investment. Now they are planning to install it in their production departments because they hope for increased efficiency there also, which, no doubt, they will secure.

"We firmly believe that within three years, air conditioning and heating will be combined in every new home, office, store and factory under the name of Comfort Conditioning.

"As far as our firm is concerned, our attitude is that every door on Main street in every town is a prospect for some type of refrigeration or air conditioning or both, even in beauty shops, dentists' offices and every other kind of business or profession.

Here's a new SMALL unit with BIG unit features



PACKED with the sales appeal only good engineering can give, the new General Electric Type CW Condensing Units embody big unit advantages rarely found in fractional hp machines.

For example, a forced feed lubrication system. And the G-E lubrication system has only one moving part which provides ample oil for every "wear point" of the compressor. That's one reason why G-E units last longer, operate more smoothly and give your customers the kind of dependability that helps your reputation.

The CW line, ranging from 1/6 hp to 1-1/2 hp is designed so that many vital parts are interchangeable. For example, the same shaft seal is used throughout the entire line. This means lower parts stock, lower overhead, less time lost in obtaining the right part.

You'll find every installation of this new General Electric line a real reputation and business builder. Call your G-E representative for full details. General Electric Company, Air Conditioning Department, Section R8127, Bloomfield, N. J.

GENERAL ELECTRIC

Better Refrigeration

NEWS OF THE EQUIPMENT INDUSTRY

CANADIAN NATIONAL EXHIBIT

THE annual world's fair—the Canadian National Exhibition, will open its gates in Toronto, Ontario, on August 27th running through to September 11th inclusive. The new three million dollar grandstand is nearing completion, in front of which, twice daily, feature entertainment will be presented. Among the star attractions this year will be Olson and Johnson and their company of mirth-makers.

Of interest to the refrigeration industry will be the displays put on by the members of the Canadian Refrigeration Manufacturers Association who occupy a large section of the Electrical Building. These exhibits will consist of the latest refrigerating equipment in all its phases.

Of general interest to visitors is the size of the exhibition park which covers 350 acres with a mile and a half of shoreline along Lake Ontario. This permits excellent view of the water sports and swimming races. There are over 50 buildings in the grounds with 12 miles of paved and well lighted streets. Miniature sight-seeing auto trains cover regular routes and make it easy for the visitors to get around.

A permanent, modern midway, half a mile long, provides attraction for young and old alike.

If you visit the Canadian National Exhibition you can truthfully say, "Now I Have Seen Everything."

★ ★ ★

MANUFACTURERS OPPOSE CONTRACTOR LICENSING

REGISTRATION or licensing of air conditioning and refrigeration contractors is contrary to the best interests of the public and of the air conditioning and refrigeration industry", said the Board of Directors of the Air Conditioning and Refrigerating Machinery Association in its recent meeting at Hot Springs, Virginia. In unanimously adopting a statement of policy on the subject, these industry leaders drew particular attention to the possibility of abuses inherent in contractor licensing and its effect on users of the industry's products.

Following is the text of the statement as adopted: "ACRMA believes that registration or licensing of air conditioning and refrigeration contractors is contrary to the best interests of the public and of the air conditioning and refrigeration industry.

"Licensing requirements provide a ready and convenient channel for abuses such as the limiting of competition by excessive fees, through unreasonable requirements, and through administration by examining boards and enforcement agencies which may be less than impartial. Excessive fees, unreasonable examination requirements, and similar features tend to limit free and competitive enterprise and create barriers to interstate and inter-community commerce.

"Licensing charges must be reflected in higher over-all costs of air conditioning and refrigeration installations to the buyer, without any assurances of quality of equipment, proper installation, and safe operation of air conditioning and refrigeration installations."

★ ★ ★

UNITED APPOINTS STANDELL

UNITED Motor Industries Corporation announces the appointment of Standell Company, Inc., main office at 570 North Broad Street, Elizabeth, New Jersey, as exclusive Eastern Distributor of the United line of condensing units.

Principal products to be distributed by the Standell Company are compressors and condensing units ranging from ¼ to ¾ hp.

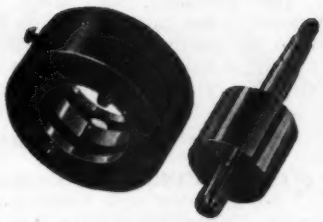
Officers of the new organization are J. J. Moss, President; Y. L. Chan, Vice President; and Franklyn Steinberg, Treasurer.

IF YOU WANT TO BE SURE YOUR PARTS ARE RIGHT FOR THE NEXT COLDSPOT JOB —

Ask Your Wholesaler for

RIXCO REPLACEMENT PARTS FOR COLDSPOT UNITS

Rixco Replacement Parts are high-quality parts, engineered to factory standards of accuracy, and guaranteed 100%. Furthermore, careful testing of all parts from basic material to finished product is additional assurance that jobs serviced with Rixco Parts will deliver longer, more dependable service. So if you want to be sure your parts are *right* for the next Coldspot job, ask your wholesaler for Rixco Replacement Parts, or write direct giving name of your regular supplier.



REBUILT ROTOR BLOCK ASSEMBLIES

1/6—1/5—1/4 H.P. Large stock, precision ground and matched sets to fit all Coldspot compressors having 15/32" shafts. For immediate exchange or outright purchase.

Exchange Price, Each **$10.50**

Outright, Price, Each **$14.25**

Blocks are equipped with new oil hole screw and locating pin, and complete sets are tested under actual operation.

No. 150—REPLACEMENT CHECK VALVES

1 to 9 each $2.45

10 or more ea. $2.25

This Rixco Check Valve consists of a cage, ball, disc, and Neoprene gasket. It saves time and labor . . . eliminates grinding or lapping of the old seat. Every Check Valve is factory-tested. No installation tool required.

CARBON VANES

These Vanes are quiet, easy to lap, save time for the serviceman. Carbon Vanes are standard equipment on all late model Coldspots. $1.25 set of 4. Specify size required.

We also have available Motor Drive Couplings, Flexible Couplings, Fans, Oil Cooling Coils, Hermetic Discharge Valve Reeds, Main Compressor Bearings, and Bearing Tools.

RIXCO DISTRIBUTING CO.

7330 Lindell — St. Louis 5, Mo.

MORE POWER for better, faster condenser cleaning

IDEAL "Hand Type" CLEANER

This powerful cleaner — with its 1⅓ h.p. *continuous duty* motor—BLOWS out every bit of matted dirt and lint from condenser units . . . performs all other cleaning jobs with equal efficiency. VACUUMS dirt from inside of cabinets and other hard-to-get-at places. Light weight, 14½ lbs.; perfectly balanced. Other attachments for spraying, drying. Also available in Medium Duty size—⅔ h.p., 9½ lbs. — IDEAL INDUSTRIES, Inc., Sycamore, Ill.

IDEAL

Distributed Through AMERICA'S LEADING WHOLESALERS

CANADIAN DISTRIBUTOR: IRVING SMITH, LTD., MONTREAL

The President, Mr. Moss, is well known in the industry, having formerly held the position of Vice President in Charge of Sales for the Standgard-Dickerson Co. of Newark, New Jersey.

★ ★ ★

UTILITY ADDS TO SERVICE

SPECIALIZING in a rebuilding service that has won nationwide comment, Utility Thermostat Co., of 4011 Halldale Ave., Los Angeles, Calif. have just added new trucking equipment to enhance their free pick-up and delivery service which operates throughout the entire Los Angeles vicinity.

Controls rebuilt by Utility not only operate "like new" but look the same way because extra care is taken to refurbish them correctly from every angle. Before being sent out, each control is boxed individually. The same service is given on pressure switches, expansion and water valves. Jack Boxert, owner, takes pride in the fact that many of the largest institutions in the refrigeration field depend upon "Utility Service." As a result, the organization has taken care of over 75,000 controls and valves in the past nine years.

★ ★ ★

OBERC HOLDS OPEN HOUSE

CELEBRATING the formal opening of their new facilities, J. M. Oberc, Inc., 55 Oakman Blvd., Highland Park, Mich., held open house for their customers and suppliers, June 19.

The new building is said to be the most modernly constructed and equipped wholesaler's store in the industry. The building occupies a space of 100 feet deep and 158 feet wide, conveniently located to all metropolitan Detroit, with ample parking facilities. The customer's counter is 72 feet long with a display floor 70 by 25 feet. Included in the new building is an assembly hall capable of accommodating an audience of 150 people, with kitchen facilities attached. The use of the hall is extended gratis to industry groups.

In designing the building, J. M. Oberc stated, "Our foremost purpose was to provide the best available facilities for our customers and completing this primary idea we have equipped a customer's room which is for their use as an office when in our place of business. Telephone service and other accommodations are at their disposal in this customers' office."

Shown in attendance at the recent opening of the new J. M. Oberc headquarters in Detroit, Mich., are—Top, left to right: Mary Joan Oberc, Mrs. Dorothy Oberc, J. M. Oberc, Floyd Duval of Ansul Chemical Co., and Norma Oberc.

Center: Howard Jones, Sales Mgr., Refrigeration Div., Kerotest Mfg. Co.; Mel Knight, Peerless of America, Inc., Chicago; Mrs. Mel Knight; Ed Kellie, Aminco Refrigeration Products Co., Detroit; and Ed Germain of J. M. Oberc, Inc., Detroit.

Bottom: J. P. Sheridan of Lamie Brothers, Marlette, Mich.; Cliff Lamie of Lamie Brothers, Marlette, Mich.; Jim Williams of Williams Electric Co., Detroit; Jack Lamb of Reliable Elec. Refrigeration Service, Detroit; J. M. Winslow of Effective Temperature Control Co., Detroit; and George Perry of Aireco Ref'n. Construction, Detroit.

Photographs by Austin Jones

KRACK

ENGINEERED

UNIT COOLERS, FIN COILS
AIR CONDITIONING

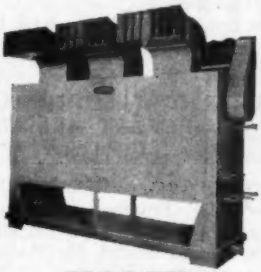
STRAT-E-FEX
The Modern Ceiling Unit

FAN-E-FEX
The All-Purpose Unit
and
ZER-E-FEX
The Low Temperature Water Defrost Unit

FLO-E-FEX
Space Saving Wall Unit

Over 112,000 MAN HOURS

of diligent laboratory research have gone into the development of KRACK Engineered Unit Coolers. Add to this the many years of field experience compiled by KRACK Engineers and you will see how you get more for your dollar in every way when you specify a KRACK Engineered Unit Cooler on your next refrigeration application. A complete line of low-side refrigeration and air conditioning equipment from the tiny Fan-E-Fex Junior to the big Blo-E-Fex Floor Type Unit.



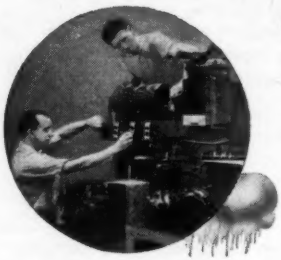
BLO-E-FEX
The Big Floor Unit

Write for further details and information to

REFRIGERATION APPLIANCES, INC. 917-23 W. Lake St. Chicago 7, Ill.

PRACTICAL TECHNICAL TRAINING

Specialize in **REFRIGERATION, HEATING AIR CONDITIONING**



More than 35,000 former students in industries the world over received practical technical training at this Technical Institute since 1903.

IN 6 MONTHS TO 2 YEARS you can train for a substantial career in industry. Our practical technical courses prepare students to become *Refrigeration Servicemen in 6 months; Refrigeration and Heating Servicemen in 12 months; Refrigeration, Heating and Air Conditioning Technicians in 2 years.* Classes begin in January, April, July, September. Write for free "PHOTO STORY" with 49 action photos of students fitting themselves for responsible positions.

MILWAUKEE SCHOOL of ENGINEERING
A Technical Institute Founded 1903

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Without cost or obligation, send me your new 44-page "PHOTO STORY."

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City..... Zone..... State.....

ASRE 44th Annual Meeting in Washington, D. C.

THE 44th Annual Meeting of The American Society of Refrigerating Engineers will be held December 5-8, 1948, in Washington, D .C., it has been announced by C. F. Holske, president of the Society. Headquarters for the meeting will be the well-known Hotel Statler.

The Baltimore-Washington Section of the Society will be host for the occasion.

★ ★ ★

EMERSON-ELECTRIC AWARDED AIRCRAFT ARMAMENT CONTRACT

OSCAR C. SCHMITT, President of The Emerson Electric Manufacturing Company, announced today that the United States Air Forces have authorized the activation by the Emerson Company of the former Walworth Plant located at Washington Park in St. Clair County, Ill. This facility will be used for the manufacture of aircraft turrets with associated electronic equipment relating to aircraft armament. The equipment to be produced will be directly connected with the new Air Force 70-Group program, and the accompanying expansion of the Naval Air Arm.

The Emerson Electric Manufacturing Company has recently been awarded production contracts for the design and production of electronic-controlled aircraft gun-firing mechanisms for new types of jet-powered bomber aircraft, as well as for conventional long-range reconnaissance and patrol airplanes.

The present contracts are a direct result of highly technical research and development work by the Armament Department of the Emerson Company during the past three years. In this work the research and development facilities of such educational institutions as the Massachusetts Institute of Technology, and the Armour Institute, are utilized and coordinate with the activities of the Emerson organization.

It is estimated that the work at the Washington Park Plant will ultimately involve the employment of about 600 people, based on the present long-range military program. In view of the augmented air strength recently authorized by Congress, it is anticipated that the production at the Washington Park Plant will provide both new equipment and replacement items for a period of at least five years.

★ ★ ★

CARRIER EXPANDS MARINE SERVICE DEPARTMENT

SHARPLY increased business in recent months has necessitated the expansion of the Service Department of the Carrier Marine Department. Located in its new headquarters at 3232 Greenpoint Avenue, Long Island City, New York. Carrier Marine Service has twice as much floor space in its new location.

From this new headquarters, the Marine Department directs its service activities in the principal ports of the U. S. It provides 24-hour service for ships which put into New York Harbor and supplies spare parts for rapid shipment to representatives in any major port in the world. A staff of 25 specialists under George R. Numrich, Marine Service and Construction Manager, is now required to handle headquarters activity.

The department maintains a stock of more than 5,000 different parts to insure prompt delivery, N. F. Cuneo, Marine Service sales supervisor, declared.

Business originates from the more than 10,000 ships of all types and tonnages which have been equipped with Carrier marine refrigeration and air conditioning systems. This "fleet" includes outstanding passenger vessels as well as hundreds of Victory and Liberty ships and special purpose ships such as tankers and U. S. Navy units.

★ ★ ★

MARLEY OPENS NEW OFFICE

THE Marley Company, Inc., manufacturers of cooling towers, water cooling equipment and spray nozzles, announces the opening of a new district office in Philadelphia at 1112 Packard Building. Robert M. Sharp is in charge.

Sharp recently completed a five-months' intensive training program at the home office in Kansas City in preparation for his new appointment. A native of New Jersey, Sharp has been associated with cooling tower manufacturers several years.

REFRIGERATION SERVICE ENGINEERS MANUAL NO. 4
2.00

The Refrigeration Contractor's ESTIMATING GUIDE

by DONALD F. DALY

THE REFRIGERATION SERVICE ENGINEERS REFERENCE MANUAL NO. 4

$2.00

A New Book

on a mighty important subject

THE author presents in this book the results of not only his own experience, covering many years of refrigeration estimating, but the knowledge of other substantial refrigeration contractors who have learned the "hard way." The purpose of this book is to bring to you, in concise form, this wealth of experience.

Remember there is no magic formulae or short cuts for estimating refrigeration installations but there are plenty of pitfalls that the experienced and inexperienced estimator can avoid.

This book points out, step by step, the approach to the problem confronting every individual and organization engaged in the business. It presents in readable form and understandable language, information that oftentimes means the difference between profit and loss.

The principal subjects include discussions on:

ESTIMATING INSTALLATION COSTS
ESTIMATING REBUILD OR OVERHAUL JOBS
CONTRACTING FOR DEALER SERVICE
REBUILDING PACKAGED UNITS ON CONTRACT
COMMERCIAL MONTHLY INSPECTION CONTRACTS
COMMERCIAL MONTHLY LABOR AND MATERIAL CONTRACTS
SERVICING EQUIPMENT FOR LOW COST OPERATION
WARRANTY SERVICE
REFERENCE TABLES

This book is principally a compilation of articles appearing in past issues of The Refrigeration Service Engineer

138 pages—6 x 8½ inches—$2.00 postpaid

NICKERSON & COLLINS CO., Publishers
433 N. Waller Ave., Chicago 44

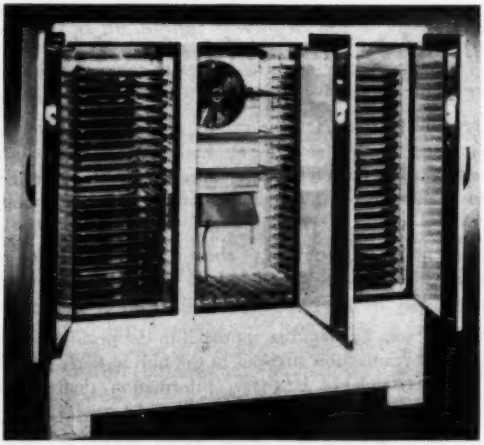
NEW AND IMPROVED EQUIPMENT

Information in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Dough Retarder

TO IMPROVE the quality of baked goods as well as reduce inventory losses due to stale dough, a new forty-eight cubic foot bakery refrigerator for dough retarding is announced by the Frigidaire Division, General Motors Corporation.

Divided into three separate compartments, the new aid to commercial baking has space for 42 standard bakery trays. Two of the three 16 cubic foot compartments are used to hold the trays while the third is left free for bulk storage of yeast, eggs, cream, milk, butter, fillings and similar baking materials.



With the new refrigerator, dough can be mixed and molded twenty-four hours in advance, saving as much as two hours on nightwork. Unexpected orders may be quickly filled using the safely stored dough. Larger batches of dough may now be prepared at one time and a constant supply of "oven-fresh" merchandise made available by baking as many times a day as desired. Peak rushes or "slow" days, caused by varying weather, are avoided with pre-mixed dough.

All interior surfaces are finished in sparkling white lifetime porcelain. The sturdy bar-type tray racks, made of hot galvanized, rust-resistant steel, permit quick, easy tray insertion and removal.

Efficient forced air cooling is done by a compact Frigidaire cooling unit mounted against the back wall of the liner. Occupying a minimum of usable space, the unit gently circulates clean, cool, moist air to all parts of the storage area. Operating with a low temperature difference between the unit and cabinet interior, this unit maintains predetermined temperature and humidity conditions.

The gleaming white Dulux finished cabinet is built of heavy gauge steel with welded overlap joints sealed to keep out moisture. Fibrous glass three inches thick in all walls, top, bottom, and doors forms an insulation that is vermin-proof, will not settle, deteriorate, or absorb moisture.

Vertical, easy action door handles are equipped with padlock rings. Hinges are matching and partially concealed.

Rubber Heater

UNITED STATES Rubber Company is now making an electric heater for refrigerators.

The heater is a strip of electrically conductive rubber which warms up to about 115 degrees and prevents "sweat" or moisture from condensing on certain parts of the cabinet's exterior.

The strip is placed between the freezing compartment and the regular cold chamber of the refrigerator. The heat keeps the dividing member or "mullion" free of moisture without materially affecting the temperature of the refrigerator.

Electrically conductive rubber, a development of U. S. Rubber is a resistance element without wires. The rubber becomes warm when energized by electricity and throws out a steady flow of heat at low temperature.

Use of the heating element in refrigerators was explained by R. D. Gartrell, development manager of U. S. Rubber's Passaic, N. J. plant. "Continued moisture will cause enamel to deteriorate," he said. "Any cold object in a room will usually develop condensation similar to that found on cold water pipes in warm weather. The conductive rubber strip spreads heat over the enamel, thereby preventing condensation."

You'll *SELL* and *SATISFY* More Families With The **BEN-HUR** Line of Farm and Home Freezers

4-WAY SALES OPPORTUNITY . . . With FOUR Ben-Hur Models — 6, 9, 12.5, and 18 cubic foot sizes — you have *four chances* to fit any prospect's need exactly. You have the ideal Freezer for the small family, the small-to-average, the average-to-large and the extra-large family, in city or farm homes.

Every one of these four nationally-advertised BEN-HUR Freezers is rich in sales features, too. Beautiful styling, table-top design, advanced precision engineering, safety hardware, mechanical perfection — all combine to place the BEN-HUR on top in feature-by-feature selling, and promise years of economical food freezing.

The BEN-HUR Freezer line is a fast-selling, high-profit prestige builder — backed by aggressive national advertising and a powerful merchandising program keyed to results for *you*. The best dealers are proving this. Only a few territories still available. Write for details.

BEN-HUR MFG. CO.
DEPT. RS • 634 EAST KEEFE AVENUE • MILWAUKEE 12, WISCONSIN

BEN-HUR FARM and HOME FREEZERS

REFRIGERATION SERVICEMEN

Your customers who own Meter-Misers depend on you to keep their refrigerator in operation

Don't let them down for lack of refrigerant to recharge these FRIGIDAIRE units— Get a supply of HERVEEN.

Customers and servicemen alike are finding this gas measures up to their standards of performance in Meter-Misers. Servicemen experience no difficulty in making this replacement to the complete satisfaction of their customers. Meter-Miser service becomes a routine call to the shop that carries a supply of HERVEEN.

HERVEEN
the IDEAL REPLACEMENT REFRIGERANT

Send for bulletin on "Procedure for Recharging Meter-Misers with HERVEEN"

For deliveries, see your local jobber or write to

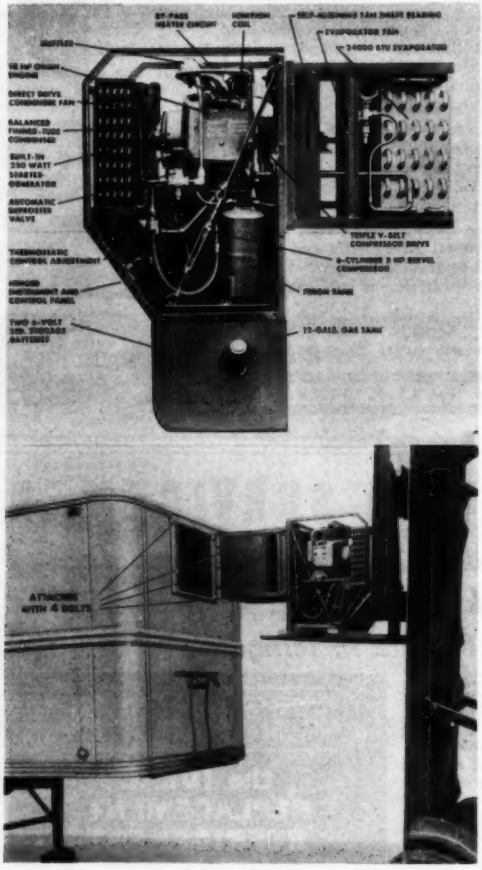
Conservative Gas Corporation, Modern Gas Division

MANUFACTURERS AND REFINERS

1084 Bedford Ave. **Brooklyn 5, New York**

Truck Refrigeration

A COMPLETELY automatic temperature controller for trailers—capable of automatically maintaining any preselected temperature from 0° to 70° F. inside the van, regardless of outside temperature—has been announced by Frostrode Products, 19929 Exeter, Detroit 3, Mich. The Frostrode Model B, the product of severals years of research by this manufacturer of industrial refrigeration equipment, comes as a complete package unit, ready to install in any insulated trailer body up to 34 feet long.



Weighing only 825 lbs. complete, the unit has a capacity of 24,000 Btu. per hour—equal to 2 tons of ice every 24 hours. Automatic defrosting, use of 10 hp. fully automatic Onan power unit, and a 5 hp. Servel 6-cylinder compressor, push button starting, unusual compactness, and ease of installation are among the features of the new unit.

The entire refrigerator-heater unit is installed with the use of only 4 bolts. Space occupied inside the van is only 7.2 cu. ft., and location is high at the front of the body where it interferes least with payload capacity

All instruments and controls are located on a "quick-glance" tilted and hinged panel outside of the van. Included are gages showing the trailer body temperature, oil pressure, charging rate of the standard storage batteries which form part of the unit, gasoline gage, and low and high pressure gages for the Freon refrigerant. On the panel, also, is a "heat or cool" selector switch and the ignition switch. Thermostat control adjustment is immediately in back of the hinged panel.

Many of the features of the design of the Frostrode Model B are aimed directly at insuring minimum of service trouble in the field. Thus the built-in 250 watt starter-generator, the direct drive axial flow condensor fan, pulleys for the triple V-belt compressor drive, and the aluminum 1500 cfm. evaporator fan are all aligned with the engine crankshaft, the fan shaft extensions being mounted in self-aligning bearings. All units with the exception of the evaporator and its fan are located outside of the van body. This includes the two 6-volt storage batteries and the 12 gallon gas tank (enough for over 8 hours operation under the most adverse refrigeration conditions).

Automatic defrosting is accomplished by circulating hot refrigerant gases through the evaporator coil after each cooling period. This melts off any ice that may have formed on the evaporator, maintaining the unit at maximum efficiency even after long periods of operation.

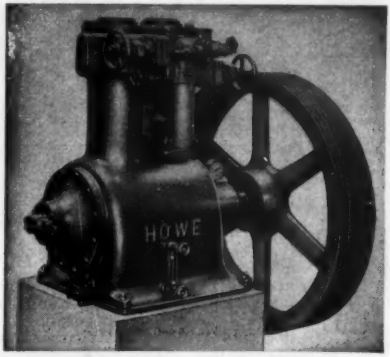
When used as a heating unit, the Frostrode Model B may be set to maintain any inside temperature from 30° to 70°, providing the outside-inside temperature differential is not too extreme. (On a 34 ft. trailer body a 70° inside temperature setting is not recommended when outside temperatures are subzero.

To operate the unit it is only necessary for the operator to set the trailer heating or cooling thermostat to the desired temperature, select the cycle desired (heating or cooling, depending on outside temperature) and turn on the ignition switch.

HOWE REFRIGERATION KNOWN THE WORLD OVER

HOWE-TO HAVE TROUBLE FREE REFRIGERATION!

"I've never seen any machine that operated so trouble-free." Here's proof . . . from a user . . . of an important advantage Howe Refrigeration Equipment offers. Trouble-free operation cuts risk of food spoilage. Saves money . . . time. Let Howe's 36 years of specialization solve your refrigeration problems with equipment *basically* right. Howe machines *give less trouble . . . keep running longer.* They're *designed* to do that. Inquiries invited.



Howe-Conditionaire Unit Cooler

Ammonia compressors 2 to 150 tons; self-contained automatic ammonia units; methyl and Freon condensing units; shell and tube condensers; brine and water coolers; unit coolers; fin coils; locker freezing units; air conditioning (cooling) equipment.

HOWE ICE MACHINE CO.

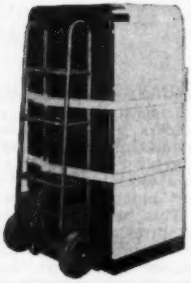
2825 Montrose Ave., Chicago 18, Illinois • Distributors in all Principal Cities

EXCLUSIVE REFRIGERATION EQUIPMENT BUILDERS SINCE 1912

DO YOU CARRY REFRIGERATORS?

Or do you use the

EASLOAD TRUCK?



Easload Appliance Trucks can save as much as 60% in moving costs. They can cut down your trucking time at least 25%. For the Easload is made to balance the entire weight of the load on the wheels.

When you use Easload Trucks, you don't carry refrigerators — you *push* them on easy-rolling ball bearing rubber tire wheels.

The Easload is handy for getting the load into and out of the truck, for going up and down steps. You can slide the load on the smooth tubular Easload handles. With the double ratchet you can use two straps instead of one. Rubber guards protect the load and other appliances.

Write Today for Free Copy of "Dear Easload"

COLSON EQUIPMENT & SUPPLY CO.

1319 WILLOW STREET LOS ANGELES 13, CALIFORNIA

Liquid Eye

TWO new models of the Liquid Eye have been announced by the Allin Manufacturing Company; this is in addition to the types which have been so well received during the first half of 1948.

Featuring the same construction—double-port, pyrex glass, streamlined design, and precision engineering—the new type of liquid indicator is female at one end and male on the other.

The female fitting eliminates the use of flare nuts in connecting it to dryers, receivers and similar installations.

A permanent copper flared insert—shown in cross section in illustration — saves valuable time for the serviceman as it provides a seal regardless of the mounting position.

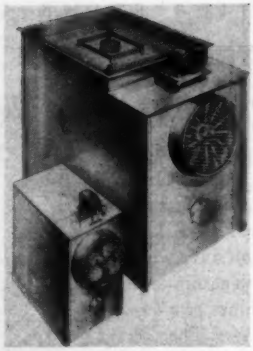
This new addition to the Allin line is available in ¼" or ⅜" sizes. Prices are the same as the present models. and can be combined for quantities.

For complete information and descriptive literature write to Allin Manufacturing Co., Dept. A., 1153 West Grand Avenue, Chicago 22, Illinois.

Aquatowers

THE Marley Company, Incorporated, is offering a complete line of re-designed Aquatowers to answer the demand for a "packaged product" up to 50 tons of refrigeration. Because the new Aquatower is so compact it is sent out completely assembled, which does away with expensive and uncertain field erection.

Features of the towers claimed by the manufacturer include all steel integral welded casing with Marley nail-less redwood filling, completely assembled ready for operation as soon as piping and electrical connections are made, two general



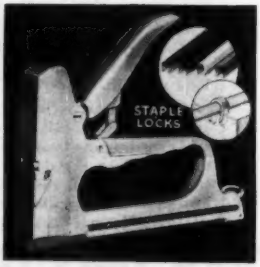
styles and seven sizes ranging from 3 to 50 tons of refrigeration, engineered for indoor or outdoor service, all components readily available for servicing.

Aluminum fans—all steel basins, sturdy fan guard insures safe operation. Complete operation and maintenance instructions are furnished.

Ask for Marley Bulletin AQ-48. Engineered and manufactured by The Marley Company, Inc., Kansas City 15, Kansas.

Stapler

AN AUTOMATIC Stapling Gun for stapling all wire, with a controlled power chamber to meet any predetermined drive without marring or injuring the wire . . . shoots a broad rust-proof staple made in any desired color.



This Stapling Gun has been tested, approved and is now being used for low tension wire by The Bell Telephone Systems.

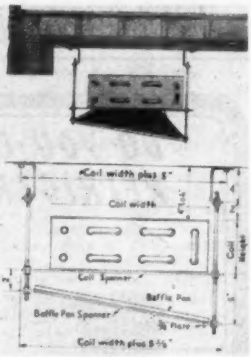
It will automatically staple braided, rubber coated, single and double strand wire and hollow tube lines to baseboards, plaster walls, window frames, door jambs, rafters and around difficult angles or corners.

This Gun uses a new type of staple with a better holding and easier driving point. It has been tested and approved as the finest and most efficient driving point for its purpose by the A. T. & T. Laboratories. The staple will drive as easily in hard as in soft woods. (Tested to hold in hard woods 56 to 64 lbs. and in softer woods 28 to 34 lbs.)

Baffle

A NEW air guide baffle that is adaptable to any make fin coil is announced by Rempe Co., 340 N. Sacramento Blvd., Chicago 12, Illinois.

More efficient distribution of air and more even tem-



perature is made possible in refrigerators and walk-in coolers when this new air-guide baffle is installed. Manufacturer claims this baffle and hanger assembly is easiest unit to install available.

This baffle causes cold air to drop in a sheet toward the floor from the low side of the baffle pan, then rise up on the opposite side of the wall and back to the fin coil, in a steady even flow. This assures an even distribution of air and even temperature throughout the refrigerator or walk-in cooler. Pans are adjustable for prop-

THE LIQUID EYE

A new type of liquid indicator

- **Eliminates Pressure Drop**
- **Light, sturdy construction**
- **Positive reaction of indicator**
- **Pyrex tubing insures safety**
- **Proven under field conditions**
- **Pliable gaskets, impervious to Methyl Chloride, Freon-12, Sulphur Dioxide and Refrigerant Oils**

Ask to see the LIQUID EYE at your jobber

ALLIN MFG. CO.
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MAKE YOUR FUTURE SECURE...
IN AIR CONDITIONING AND REFRIGERATION!

*The man who knows the groundwork . . . the man who has modern shop practice and servicing methods at his command . . . is the man equipped to get ahead in these progressive fields.

U.E.I.'s intensive, practical shop training gives you this necessary know-how in day or night classes. Non-residents may obtain fundamentals through home study in spare time followed by a short, intensive shop practice session. Either way . . . the U.E.I. course is *practical* and *complete*.

Civilians and veterans, get the facts before you by clipping the coupon!

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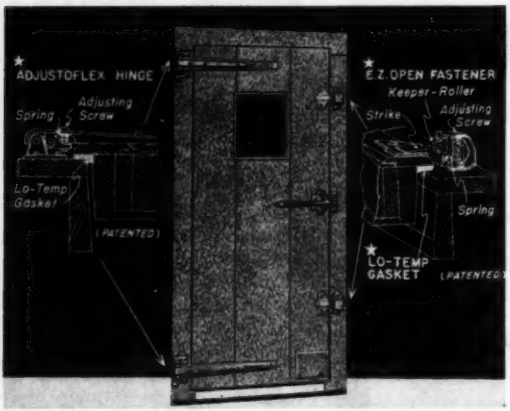
er pitch to induce free circulation of air.

Ceiling brackets are galvanized steel. Hanger rods and nuts are rust proofed. Baffle pans 18 ga. galvanized steel fully insulated, equipped with ¾" flare connection for drain line. Baffles are always made 8" longer than coil fin length. Coil and baffle pan are independently adjustable and independently supported. Installation is most simple—hangers and spanners are installed then coil and baffle pan are slid into place. The Rempe Air Guide baffle can be installed with old equipment.

Doors

A NEW type cold storage door for sub-freezing and sharp freezing operations, provided with positive means to produce a uniformly tight seal is announced by Jamison Cold Storage Door Company, Hagerstown, Maryland.



The uniformly tight seal is obtained through three exclusive, patented, features:

(1) The door hinges, combining self-adjustment with screw regulated spring pressure, automatically seats door gasket. To compensate for gasket wear the spring pressure can be altered by simply turning an adjusting screw.

(2) The two-point fastener maintains a uniform sealing pressure and requires minimum effort to close and open door. Operation of the fastener is completely automatic and is adjustable through the medium of an exterior, easily accessible adjusting screw.

(3) The gasket, developed especially for use on this door, is made of sponge rubber encased in a water impervious skin. It is applied to the full overlap of the door and not only surface seals the door against the frame-casing but plug-seals the space between the door and frame.

Front and back operating handles are provided. The design of the fastener is such that no connection between the front and back handles is required.

The front, edges and frame-casing of the door are metal clad. Possible deterioration because of moisture precipitation is eliminated and sanitary conditions maintained.

Merchandiser

THE ICE CREAM Merchandising Department of The Liquid Carbonic Corporation, Chicago, announces a new visual top for ice cream cabinets called the Viz-O-Magic merchandiser which is designed to stimulate self-service package sales.

One of its features is a new patented device named the Magic Lift that automatically elevates the contents as the top packages are removed. According to the manufacturer, the top row of packages is always at the top of the cabinet making them visible and easy to reach.

On the flavor board is a mutli-colored Vita Vision three dimension illuminated display. Slanted glass panels which can be easily opened with one finger and will not frost up are another of the features claimed. The interior is illuminated and a tilted mirror in the rear of the unit displays the contents from every angle.

The Viz-O-Magic merchandiser is designed to fit any year model of double row Liquid Red Diamond cabinets.

Coldspot Vanes

QUIET carbon vanes for the Coldspot compressor, precision ground to give maximum efficient and long service to the Coldspot compressor assembly are now available in sets. There are three sizes: 1", 1¼" and 1½" to fit all models. To replace original equipment there is a new bellows seal for the Coldspot, with a steel coil spring with ends ground parallel to supply an even pressure. The seal nose is of case hardened steel, lapped to a micro finish. These new products are for Coldspots having 15/32 shaft and are available from the manufacturers, Mechanical Enterprises, 4856 Lankershim Boulevard, North Hollywood, Calif.

The PREMIER KIT

Reconditions Recessed or Flush Valve Ports in Minutes!

Now

See This Time and Money Saving Tool at Your Jobbers. Typical testimonial letter

APPLIANCE SERVICE COMPANY
304 Alwine Avenue
Greensburg, Penna.

February 10, 1948

The Premier Co.
891 Park Ave.
Baltimore 1, Md.

Attention: Mr. H. W. Goodhart

Dear Sir:

I have been using the PREMIER SELF ALIGNING VALVE GRINDING KITS for the past three or four months, and would like to take this opportunity to thank you for coming out with such a tool.

Since using this kit, I do not see how I got along without it all these years. It has saved me money and valuable time in waiting for replacement parts.

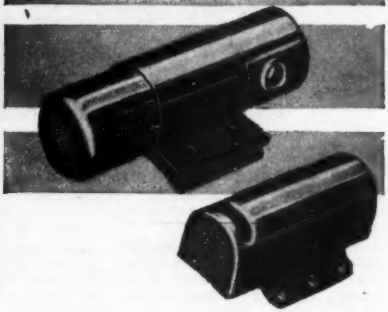
Very truly yours,
APPLIANCE SERVICE COMPANY
(signed) Paul Brandstetter
Service Manager

PB:ct

THE PREMIER CO.
891 PARK AVENUE • BALTIMORE 1, MD.

NEAT JOB . . . MORE PROFIT!

MOTOR CAPACITOR HARDWARE



●Be right electrically! Use Aerovox exact-duplicate or universal motor-capacitor replacements. But also be right mechanically! Aerovox motor-capacitor housings, end caps and mountings make the job look "just right". Minimum stock—maximum variety.

Yes sir, it's that "good as new" repair that spells satisfied customers; higher prices for repair jobs; bigger profits. Ask your supplier for Aerovox capacitors and capacitor hardware!

AEROVOX capacitors

FOR RADIO-ELECTRONIC AND INDUSTRIAL APPLICATIONS

AEROVOX CORP., NEW BEDFORD, MASS., U.S.A.
Export: 13 E. 40th St., New York 16, N.Y. • Cable: 'ARLAB'
In Canada: AEROVOX CANADA LTD., Hamilton, Ont.

Headlight

A NEW TYPE dry cell electric headlight has just been announced by the Justrite Manufacturing Company, 2061 N. Southport Avenue, Chicago. This headlight—called the Justrite Mechanix Headlite. Model 1902—is a product of Justrite's Automotive Products Division.

The manufacturer states that this headlight enables mechanics to quickly have plenty of light on their work even in tight spots and at the same time free use of both hands. Some of the applications are service stations and garages (in place of drop cords), tow cars, truck fleets, airplane service and maintenance, and many others.

The Mechanix Headlite consists of a head lamp attached to fibre straps arranged to fit the contours of the head, and a battery case securely fastened to the strap assembly. The head lamp, made of steel —finished in "Zinc-Chrome," is provided with reflector and spread-light lens, and bracket mounted with swivel for easy focusing in any direction. An adjustable elastic band insures a secure fit, and sponge rubber pads make for comfortable wearing. Two standard flashlight dry cells are used

Containers

FRESH and frozen foods can now be shipped safely and at lower cost because of new plastic products.

New shipping containers for foods, made of a tough, thermoplastic material and insulated with light weight plastic foam, have been jointly developed by United States Rubber Company and R. H. Bishop Company of Champaign, Illinois. They are now being produced by the Bishop Company.

The bottom, sides, lid, inner container and all internal bracing in the food shippers are constructed of the rubber company's Versalite, which is non-corrosive, has very low heat conductivity and is lighter in weight than any other known material suitable for this application. Important features of the thermoplastic material are high impact strength and a specific gravity of less than 1.1. All connections and seams in the containers are plastic welded to assure a strong, permanent pressure-tight bond, which also prevents any possibility of vapor transfer into the insulation space.

The shipping containers are completely insulated with Flotofoam, a plastic foam that weighs less than one pound per cubic foot.

Temperature inside stays unusually even during transit, since heat and moisture transfer is practically eliminated through the use of a special lid seal of cushioned synthetic sponge rubber. The only metal is in the handle, latches and skid strips.

One container, primarily designed for shipment of frozen foods with dry ice, has a maximum storage capacity of 4.66 cubic feet. Another, primarily designed for shipment of fresh foods with water ice, has a maximum storage capacity of 7.44 cubic feet. Weight of each, when it is empty, is only about 75 pounds.

Frigid Coat

A REAL maintenance problem of the cold storage plant operator is answered in a plasticide base, high gloss white enamel named Frigid-Coat. Specifically made to meet the requirements of cold storage plants, frozen food locker rooms, food freezing units and similar plants where food products are handled at low temperatures.

This enamel is non-yellowing and can be applied with ease by brush or spray at temperatures as low as zero. In one coat Frigid-Coat stops stain from bleeding through asphalt or cork insulation. Gives an excellent gloss and adheres equally well to wood, metal or other surfaces. It is the product of one of the leading manufacturers of specialized paints for industry.

Plier Set

A NEW SMALL plier set No. 14 has been announced by the Bonney Forge and Tool Works, Allentown, Penna.

All three pliers are 4" in length and are one of the handiest items in any mechanic's tool box. These pliers were designed particularly for ignition, starter, generator, carburetor and instrument work.

The set consists of one flat nose plier, one short chain nose plier and one diagonal cutting plier and they come in a handy leatherette kit.

REFRIGERATOR DOOR GASKETS
JARROW PRODUCTS
Pocket GASKET SELECTOR
ACTUAL SIZE CROSS SECTIONS
Free TO SERVICEMEN AND CONTRACTORS
Get your Gasket Selector from your Wholesaler or write:
JARROW PRODUCTS

IT'S THE TRAINING THAT COUNTS!

Practical Shop Training

in

AIR CONDITIONING

DOMESTIC—COMMERCIAL

INDUSTRIAL REFRIGERATION

Service, Maintenance and Installation

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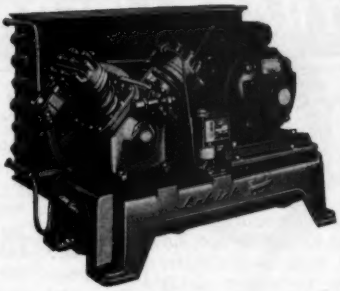
Veterans Inquire About G.I. Training. Train in Birmingham, *"The Magic City."*



110 MODELS

¼ H. P. to 5 H. P.

Air and Water Cooled

For High, Medium or Low Temperature Freon—12 or Methyl Chloride.

★ **PACKAGED AIR COOLED**
¼ H.P. 1/3 H.P.

★ **STANDARD DUTY AIR COOLED**
1/3 H.P. ½ H.P. ¾ H.P.

★ **HEAVY DUTY AIR COOLED**
1/3 H.P. ½ H.P. ¾ H.P.
1 H.P. 1½ H.P. 2 H.P.

★ **HEAVY DUTY WATER COOLED**
½ H.P. ¾ H.P. 1 H.P. 1½ H.P.
2 H.P. 3 H.P. 5 H.P.

★ **COMBINATION AIR AND WATER COOLED—½ Through 2 H.P.**

Lehigh BLU-COLD CONDENSING REFRIGERATION

See General Catalog for Complete Specifications

Lehigh **BLU-COLD**
HEAVY DUTY CONDENSING UNITS
Manufactured By
Lehigh Manufacturing Co
Plant—LANCASTER, PENNA.

TRADE LITERATURE

New Cesco Catalog

A NEW catalog just released by the Chicago Eye Shield Company not only lists the company's products but also tells where to use, how to use, how to maintain and how to select industrial protective equipment. By

going well beyond the scope of an ordinary catalog it becomes a guide to accident prevention.

Among the 64 pages in the book are 16 pages explaining correct safety procedures. For example, a spread on spectacle-type goggles gives applications and uses of spectacles, what features to look for in good goggles, how to fit spectacle-type goggles, proper care of goggles, and construction details of Cesco products. Pages like these also give complete buying data on cup goggles, welding goggles, welding helmets, face shields, respirators, masks, hoods and protective aprons and sleeves.

Facts presented on these technical pages are based on official reports and recommendations, and much of the information applies to all protective equipment, regardless of make.

A copy of this 64-page Cesco catalog can be obtained by writing the Chicago Eye Shield Company, 2300 Warren Boulevard, Chicago 12, Illinois.

★ ★ ★

Zonolite Film on Vermiculite

COMPLETION of a new industrial film, "Zonolite, the Wonder Material," has been announced by the Zonolite Company, Chicago, world's leading miner and processor of vermiculite products.

The movie presents the history and detailed applications of this lightest of all building material aggregates. It treats the revolutionary advance in all phases of the construction industry brought about by the development of vermiculite as loose fill insulation and phenomenally lightweight aggregates for plaster and concrete.

The black and white, 16 mm. sound film runs 18 minutes. Interested organizations may arrange showings by writing to: Film Section, The Zonolite Company, 135 South La Salle Street, Chicago, Illinois.

★ ★ ★

Vilter Bulletin

THE "new look" in evaporative condensers is portrayed in a new bulletin recently published by the Vilter Manufacturing Company, Milwaukee, producers of refrigeration and air conditioning machinery and equipment.

Considering its merits as a water saver when condensing the refrigerant, the evaporative condenser solves the problem of excessive water cost or short supply, wherever either condition exists, by re-using the condenser water. The bulletin also points out six other advantages of the evaporative condenser over other refrigerant cooling mediums.

Fully illustrated with photos of actual installations and construction features, the catalog includes description and diagrams of the operation and recommended application of Vilter evaporative condensers. A page of specifications showing dimensions and engineering data is also set forth in the eight page bulletin.

★ ★ ★

G. E. Silicones and Plastics

A 30-PAGE illustrated bulletin (No. CDR-57) describing in detail G-E silicone products has been issued by the General Electric Company's Resin and Insulation Materials Division. The bulletin describes the new G-E silicone resins, oils, greases, water repellents, and rubber together with their many industrial uses. Charts and tables are included.

An 18-page illustrated booklet (No. CDP-576) describing briefly the wide range of products manufactured by the company's Chemical Depart-

New! Improved!

CHARGING HOSES

● Made from heavy duty rayon reinforced neoprene hose. Exceptionally flexible and sturdy; will permit small radius bends. 36" lengths. Will withstand temperatures to -40 degrees F. and pressures in excess of 1000 lbs. per square inch. Low original cost and high refrigerant resistance means long time use and resulting economy.

Your wholesaler can supply you.

Fine PRODUCTS CO.

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Type A—Standard *Type B—Quick-Coupler*

Micromatic honing reduces wear...

—on Servel Supermetic cylinder bores by finishing them to the closest tolerances ever obtained on this type of mass production manufacture. Call your local Servel distributor for full information.

POWERED BY Servel

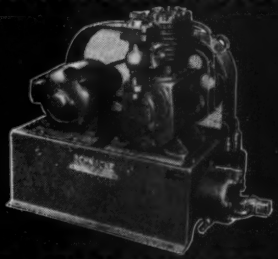
Electric Refrigeration Division

SERVEL, INC.

EVANSVILLE 20, INDIANA

SCHNACKE

COMPRESSORS and *Complete* CONDENSING UNITS



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But the man who has been trained to go about a job right—does it the easiest way. C.T.I. training is for the man who wants to think as he works. It's for the man who wants to GET MORE DONE and EARN MORE. Full or part time Residence course or Combination Home & Shop Training. Veterans—C.T.I. course approved under G.I. Bill. Non-Veterans—Do not let lack of ready cash delay your start. Investigate our Pay After Graduation Plan and our Low Easy Payment Plan. Write for our Free Booklet and interesting publication SKILLED TRADESMAN. No obligation.

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Gentlemen:

Please send me free information about your training in Refrigeration & Air Conditioning.

Name .....

Address .....

City ..... State .....

ment has just been issued. Products of the company's Plastics Division, Resin and Insulation Materials Division, Metallurgy Division, and Compound Division are described together with their many industrial applications.

Copies may be had by writing the General Electric Company, Chemical Department, 1 Plastics Avenue, Pittsfield, Mass.

PERSONNEL NOTES

Emde Elected Chairman

L. EMDE, vice president of Temprite Products Corp. of Detroit, Michigan, was elected Chairman of the Drinking

L. EMDE

Water Cooler Manufacturers Association at its annual meeting held in Pittsburgh, Pa., on June 11.

Also elected were C. M. Cordley, President of Cordley & Hayes, New York City, as Co-Chairman and J. F. King, Vice president of Halsey W. Taylor Co., Warren, Ohio, as Treasurer.

A committee consisting of John Drake, Norge Division, Borg-Warner Corp.; Wm. Mays, Cordley & Hayes; Edward South, Frigidaire Division, General Motors Corp.; E. A. Barket of General Electric Company was appointed to review statistics and marketing services of the Association and make recommendations at the next meeting for reporting sales by trading areas as well as on a unit basis.

★ ★ ★

Electrimatic Names Webb

THE Electrimatic Division of the Simoniz Company announces the appointment of Clyde L. Webb as sales representative for the states of Texas, Mississippi and Louisiana. For the last two years Mr. Webb has been Surplus Property Officer in the Refrigeration Equipment Sales Division of the War Assets Administration. During the war he was with the Refrigeration and Air Conditioning Branch of the War Production Board with headquarters in Washington, D. C.

For three years prior to the war, Mr. Webb was manager of the Farr-Webb Company in Houston, Texas, which was a commercial refrigeration and air conditioning co-partner dealership. For ten years he was associated with the Kelvinator Division of the Nash-Kelvinator Corporation, where he served in the capacities of Commercial Sales Engineer and Field Service Supervisor. Mr. Webb's long experience in the application, installation and servicing of commercial refrigeration and air conditioning equipment qualifies him to be of valuable assistance to manufacturers of such equipment. At present Mr. Webb resides with his wife and two children at 3032 S. Abingdon Street, Arlington, Va.

★ ★ ★

Rinelli to Customer Relations

WILLIAM R. Rinelli has been appointed director of Ansul Chemical Company's new Customer Relations Depart-

W. R. RINELLI

ment. This department will correlate the company's advertising, publicity, sales promotion and marketing.

Rinelli is well known in the refrigeration industry as the co-author of a number of technical papers. He is also one of the authors of "Refrigerating Data Book," published by the American Society of Refrigerating Engineers.

Prior to this new assignment, Rinelli was

RECORDING INSTRUMENTS
of Air Temperature and Motor Operation

These instruments take the guesswork out of trouble-shooting on any type of refrigeration equipment. With them you can automatically chart a written record of the true performance of the equipment you are servicing in the home, store, or cold storage plant. Such charts, taken before and after the job, are good proof of work well done.

Tempscribe styles for refrigeration service:

Temperature Ranges: — 20° to + 40° F., or — 10° to + 50° F.
Operation Recorder: either Type D for series connection up to 250 volts, or Type C for parallel connection up to 250 volts.

Ask your jobber about TEMPSCRIBE or write for Bulletin 731.

BACHARACH INDUSTRIAL INSTRUMENT CO., 7000 BENNETT ST. • PITTSBURGH 8, PA.

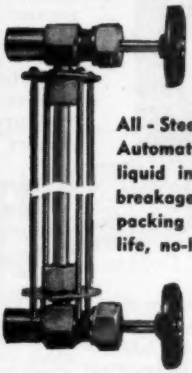
Farm & Home Freezers

ACE CABINET CORP.
NEW BEDFORD, MASS.

Self Contained and Remote

SHANK VALVES

FOR A LIFETIME OF GOOD PERFORMANCE



SHANK ALL-STEEL GAUGE SETS

All-Steel construction. Automatic shut-off of liquid in case of glass breakage. Composition packing rings give long life, no-leak seal.

ORDER FROM YOUR JOBBER TODAY

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GASKETS—GASKETS

• Play safe and specify CHICAGO-WILCOX gaskets for every refrigeration need. Our complete gasket service provides a dependable source of supply to meet your requirements. Get full details today.

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TINIT SAVES TIME

When you've got a "tough job"—just tin with TINIT. Flows into hard-to-get-at places—into joints and bends! Cleans, tins and fluxes stainless steel, black iron, hard-drawn copper and all metals in one quick operation. Sold by refrigeration service, tinning supply, automotive and other jobbers for 19 years.

BUY FROM YOUR JOBBER

TINIT MFG. CO., INC.
P. O. Box 794, Denver, Colo.

manager of Ansul's development division. He was graduated from the University of Wisconsin in 1933 and has been with Ansul 13 years.

★ ★ ★

Pendergast Now With Hupp

THOMAS S. Pendergast, widely known refrigeration sales executive, has been appointed Sales Manager of the Refrigeration Products Division of Hupp Corporation,

T. S. PENDERGAST

Cleveland, Ohio, according to an announcement issued by R. S. Geddes, Hupp president.

Mr. Pendergast brings to the Hupp organization an extensive refrigeration sales and manufacturing experience covering twenty years. Formerly vice president of the Universal Cooler Corporation and later Assistant to the General Manager of the Universal Cooler Division, International Detrola Corporation, Marion, Ohio, he served on several government boards during World War II, notably the General Advisory Committee, Refrigeration and Air Conditioning Industry, assisting the War Production Board, and as a member of Task Committee of War Food Administration.

Mr. Pendergast's appointment reflects Hupp Corporation's increasing interest in the refrigeration industry, according to Mr. Geddes, and is a further step in the development and marketing of Hupp products under the Hupp name. Hupp home freezers and frosted food display cases will be the initial products of Hupp's refrigeration program.

★ ★ ★

Gesick New Mills Treasurer

AT THE meeting of the Board of Directors of Mills Industries, Incorporated, June 29th, Edward J. Gesick was elected Treasurer. Mr. Gesick was formerly Assistant Secretary and Assistant Treasurer of Popular Mechanics Company of Chicago.

The Board of Directors of Mills Industries, Incorporated, now consists of Ralph J. Mills, Chairman of the Board; Herbert S. Mills, President; A. E. Tregenza, Executive Vice President, formerly executive vice president of the Jefferson Electric Company, Bellwood, Illinois; Simms D. McGuire, President of Beloit Dairy Company; and Fred L. Mills, Jr., son of the former president of Mills Industries.

★ ★ ★

T. A. Mayes Joins Kramer

THE Kramer Trenton Company announces the appointment of Thorpe A. Mayes, Jr. of Dallas, Texas, as their representative, covering the South Central area of the United States. Mr. Mayes, a graduate of Lehigh University, has had wide experience, including association with Atlantic Refining Company, General Motors, Lehigh Foundries,

T. A. MAYES

and in the Army, from which he was discharged with the rank of Lt. Colonel. Mr. Mayes is a licensed pilot, and will cover most of the territory with his own plane.

★ ★ ★

Peterson Represents Cecil Boling Co.

THE Cecil Boling Company announces that H. P. Peterson is their new representative in the Philadelphia area handling Bush Manufacturing Company and The Heat-X-Changer Company products. Mr. Peterson was formerly chief engineer for the Bush Manufaturing Company and recently a consultant in refrigeration at Manchester, Conn. He is a member of the ASHVE and ASRE and has served on the standards and heat transfer committees of the latter society. He is a graduate of the Worcester Polytechnic Institute. During the war he had an active part in the development of aircraft heat transfer

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MILLS

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STERILAIRE*

THE *Ultra Violet*
GERMICIDAL LAMP
for use only in refrigerated areas

STERILAIRE* brings to the refrigeration industry new opportunities for service and *profitable sales.* Refrigeration dealers sell **STERILAIRE** with new walk-in boxes. Service men sell **STERILAIRE** to their regular customers.

These Wholesalers merchandise STERILAIRE. Ask them for details

ARKANSAS
Refrigeration & Electric Supply Co.
CALIFORNIA
Associated Refrigeration & Equipment Co.
Authorized Supply Corp.
Rauch & Monroe
Refrigeration & Industrial Supply Co.
Refrigeration Service, Inc.
Refrigeration Supplies Distributor
Valley Refrigeration Supply Co.
Van's Supply
COLORADO
Western Appliance Corp.
FLORIDA
Ace Refrigeration Supplies
ILLINOIS
Chase Refrigeration Supply
Service Parts Co.
MINNESOTA
Refrigeration & Industria Supply Co., Inc.
MISSOURI
N. O. Nelson Co.
Superior Refrigeration Suppl
MONTANA
Refrigeration Supply Co.
NEW JERSEY
W. I. Freeman & Co., Inc.
NEW YORK
County Seat Supply Co., Inc.
Halsey Supply Co.
OHIO
Radio & Refrigeration Supply Co.
Ultra-Violet Equipment Co.
OKLAHOMA
K & M Supply Co.
M & V Supply Co.
Macklanburg Supply Company, Inc.
OREGON
Peerless Pacific Company
PENNSYLVANIA
Joyce Refrigeration & Equipment Co
TEXAS
N. O. Nelson Co.
Texas Refrigeration Supply Co.
United Refrigeration Company
WASHINGTON
Peerless Pacific Co.
Refrigeration Wholesalers, Inc.
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equipment and other specialized material. He will make his temporary headquarters on Homestead Road, Strafford, Wayne, Penna.

★ ★ ★

Miller of Servel

BASIL S. MILLER has been named district manager for Servel, Inc.'s Electric Refrigeration Division, according to

B. S. MILLER

Harry F. Bell, field sales manager.

Mr. Miller who has been in the refrigeration field in sales and engineering work for more than 20 years will represent Servel in one of the company's midwestern territories.

In his new position he will cover Kansas, Missouri, Illinois, Indiana and Kentucky. His headquarters will be in St. Louis.

★ ★ ★

Marlo Appoints Roepke at Houston

GEORGE E. ROEPKE has been appointed sales representative of the Houston office of Marlo Coil Company, St. Louis, Missouri.

Mr. Roepke studied chemical engineering at Washington University and at Missouri University. He was in charge of sales engineering for the Electrol Company in St. Louis before working in

G. E. ROEPKE

the Development and Engineering of Refrigeration Controls Department for Alco Valve Company, St. Louis.

He is a member of the A.S.R.E. and the Engineer's Club of St. Louis.

★ ★ ★

Otter Elected V.P. of Philco

JOHN M. OTTER has been elected Vice President and General Sales Manager of Philco Corporation, it was announced recently.

Otter joined Philco in 1926 as district sales representative in Northeastern Pennsylvania. He continued in that capacity until 1935, when he was named sales manager of the Philadelphia branch of Philco Distributors, Inc.

In 1937 he was appointed manager of the Detroit office, and was then made general manager of the Chicago branch of Philco Distributors, Inc. Two years later he was named sales manager for the Middle West and in 1944 was made sales manager of the Radio Division with headquarters in Philadelphia, when the Company's selling organization was being enlarged and strengthened in preparation for the post-war period. In 1947, he was promoted to the position of general sales manager of Philco Corporation.

★ ★ ★

Sales Manager for Delavan

WM. F. HAND has been appointed sales manager of Delavan Mfg. Co., Des Moines, Iowa, manufacturers of refrigeration replacement parts. Hand has been in sales

W. F. HAND

work in related fields for many years, and was secretary and treasurer of Pneumatic Controls Corp., prior to his connection with Delavan.

A speed-up in the expansion of the Delavan line of refrigeration parts will be his first objective, Hand said. A complete line of Delavan parts for late model refrigerators should be ready by the end of this year, according to Hand.

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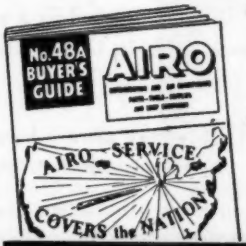

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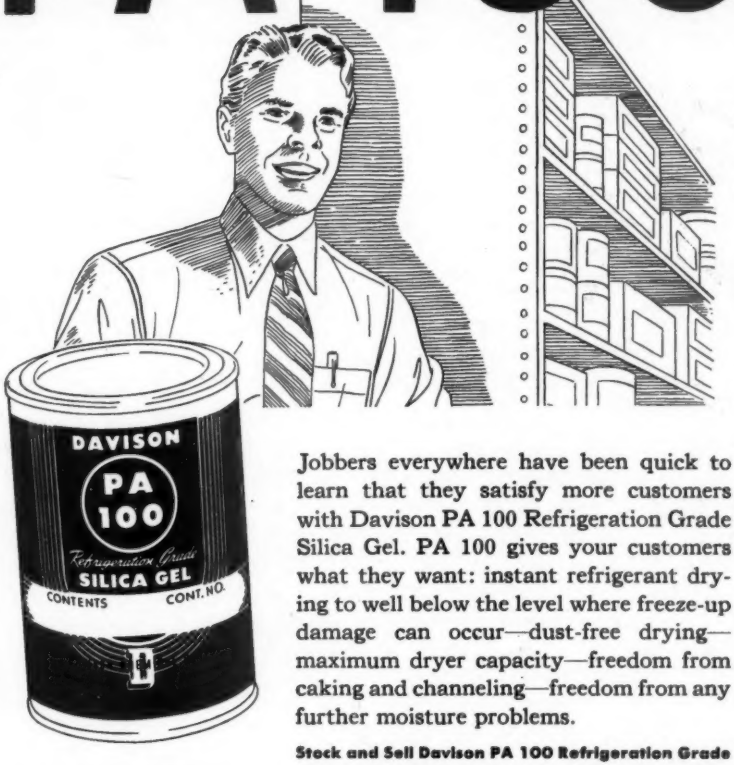

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